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The Prognosis Value of the American Council on Education Psychological Examination.

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THE PROGNOSIS VALUE

OF THE

AMERICAN COUNCIL OF EDUCATION PSYCHOLOGICAL EXAMINATION

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Dedicated

to

Gretchen

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THE PROGNOSIS VALUE OF THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION.

CHAPTER I

INTRODUCTION

A. THE MEANING OF "PROGNOSIS"

The word prognosis in its original Greek form, like its Latin derived synonym prediction , has a rather eerie, mystic meaning, associated with soothsaying on the basis of animal entrails and oracles from loquacious idols of clay. It naturally, in such a sense, has no place in scientific research. Fortune telling and science make very miserable bedfellows. It is not in this sense that we use the word prognosis in this study. It is rather in the spirit which makes the figure common among physicians. To medical men prognosis is an opinion as to the probable result of an illness formed from a consideration of other cases shown to be similar by the presence of resembling symptoms. The doctor examines his patient carefully, takes the temperature, blood pressure, pulse; and, on the basis of these cues, which help to classify this particular case among others like it, he makes his prognosis. His prognosis is good where all signs point to a category of cases with frequently favorable results; bad when, even the best of treatment seldom has a desirable effect. With this meaning we carry over the word prognosis into the field of education. We may ask if our

particular education expedient is likely to be worth anything in the unique case of personality that is set before us.

"The function of prediction in education" says Feder (39 p. 602) "is to facilitate guidance, not to achieve rigid determination".

A special device has been developed, not to replace the individual case study, which is always finally essential, but to supplement it and point the way. That device is the procedure of statistics. Statistics is the child of natural law and the love of taking a chance. It has been employed most often in the gambling casino and in the insurance office. It directs attention to the odds, the probabilities of certain future events. It is in no sense oracular, laying no pretension to certainty. Prognosis, however, in its secondary significance, makes it its ally. Gambling houses are enabled, through its use, to carry on a thriving business; insurance companies to provide at least one source of solace to worried minds. Still gambling houses sometimes go broke and insurance companies are forced to charge fairly good sized premiums, because results do not always come out as expected.

"No subjective or objective method of estimating success" says Segel (96 p. 2) "has as yet been inaugurated which is perfect". Especially is this true of individual cases. We can venture the prediction that if we toss up a quarter a thousand times, it will come heads somewhere around five hundred because there are just two equal possibilities; but woe be on us if we

wager very far on what will be the results of just two tosses of the coin. We can calculate, in an insurance office, that a certain number per thousand will die next year; but only God knows whether it is going to be Mr. Smith or Mr. Jones. With its limitations understood, however, and with the constant thought that it is nothing more nor less than a very elaborate betting system,* the science of statistics comes to be of vital assistance in any kind of scientific prognosis we attempt. It is certainly an improvement over the old trial and error method which "is costly for both the individual and society". (ibid)

Unfortunately the limitations have not always been clearly in mind. The correlation coefficient, one of the most useful devices of statistics, has often been misinterpreted by researchers who have misunderstood its mathematical implications. Its appearance as a decimal, together with the oversimplified knowledge that it is the measure of the covariation of two variables, have led numerous writers to assume that a given correlation indicates that one variable can predict the other in a percentage of cases equal to the number appearing in that correlation. (57 p.333). This is so palpably untrue to statisticians that they have overemphasized its fact, to the extent that they have now caused a reaction, among non-statisticians, of discounting the value of the correlation coefficient almost completely in

*"The immediate situation demands, however, not a perfected technique but merely an intelligent betting system". (Bingham 5 p. 57)

the ranges that it most usually appears. "The forecasting efficiency "warns Hull (ibid) "rises as much between correlations .98 and 1.00 (20 points) as it does between zero and .60. It is ironical that this region of extremely low efficiency is exactly the region where the correlations of all modes of tests fall. The range "measures for predicting college success whose correlations with the criterion tend to center within the range from .45 to .60" say Boardman and Finch (8 p.447) "have only a limited usefulness. While they are of value in indicating the probable performance of a group, the degree of error in predicting the success of individuals is so large that they may be used only with great caution." * There are two statistical methods of calculating how reliable may be predicted values, the Probable Error of Estimate and the Standard Error of Estimate. (42 P. 185). Hull warns that allowing for this error an r. of .50 indicates a forecasting efficiency of but 13% and an r. of .20 but 2% (57 p. 337). "The paradoxical and disheartening thing" he says (ibid) "is that even"so, with a r. of .70 "the forecasting efficiency will be less than 29 per cent".** The situation is even more poignant owing to the fact that the particular correlations, under consideration in this study, between intelligence and scholarship, (according to Hildreth (52) range mostly from .50 to .65. "Few of them" says Burgert (16 p. 613) "give greater than about 13% accuracy for prediction. This is in agreement with the findings

*1- (See also 130 p. 406; 53 p. 115; 41 p. 72; 101 p. 11; 90 p. 758; 37 p. 785)

*2- See also 55.

of other investigators and substantiates the fact that, as a means of predicting academic success as generally measured by grades, the intelligence quotient is unsatisfactory". Thus we have run the gamut of pessimism up to the point where this above quoted author is willing to throw out entirely the only possible usefulness of an intelligence test. If this be still true after substituting the word "prognosis", as we have defined it, for his word "predicting" (in what sense he uses it we do not know), the task of this study is a folly.

The situation, however, is not as dismal as a superficial viewing may seem to indicate. We are not looking for a means of fortune telling; but merely for something useful as a symptom or a cue of the amount of educability we have to work with. "This raises the question," then according to Hull (57 p.337) "as to how low forecasting efficiency a test may have and still be useful". "It is doubtful" he says (ibid) "whether any prognostic test ever has risen consistently above an efficiency of 50 percent." A forecasting efficiency of at least 15 percent (which points to a correlation of .50) is very desirable. That must not be understood, however, to mean that only 13% of the common factors in the two variables have been isolated by that .50 correlation; (ibid.) No, rather this is its meaning:- "Such computations show that even under the more complex conditions assumed, it still remains substantially true that the correlation coefficient is at least a minimum percentage statement of the amount of identity of the determiners of the respective types of activities.

This means that a correlation of .50 will always mean an identity of more than 50 percent among the determiners of two variables and sometimes considerably more.* Rugg outlines a table of correlation usefulness. A correlation is "negligible" or "indifferent" when the r. is less than .15 to .20; "present but low" when the r. is from .15 to .20 to .35 or .40;" markedly present" when the r. is from .35 or .40 to .50 or .60 and "high" when it is above .60 or .70. (93 p. 256)* Hull has a similar table. Below .45 or .50 an r. is useless for differential prognosis, from .50 to .60 of value, from 60 to 70 of considerable value, from .70 to .80 of decided value but rarely found; and above .80 not obtained by present methods." (56 P. 276). More telling and less complicated refutation of the current skepticism concerning educational prognosis is stated by English and by Bingham. English avers:- (36 p. 423) "But imagination and scientific common sense rather than mathematic ingenuity are needed. Given these, the chief requirement is that we know precisely what it is we wish to predict and keep our eye firmly on that goal." Bingham declares (5 p. 57) that what is desired is not so much a "perfected technique" as "merely an intelligent betting system" and that it is far better to go ahead and make use of our possible present results in our educational system than to "await the millenium".

*-1 Partially quoted and agreed with by Greene and Jorgensen (48 p.163). Stone (103) found by experiment that over half of a class of 600 had discrepancies of less than 20%. Kelley (64p.45 calls correlations for purposes of group comparisons of .50 or better satisfactory. Tiegs and Crawford (128p.163) say "a correlation of .50 may be sufficient basis for a general policy".

*-2 Quoted by Crane and agreed with (25)

There are other causes than errors of estimate, however, that make for lowered correlations.

(1) Two variables seldom vary exactly together. An example of a perfect correlation between two variables is that between the diameter and the circumference of a circle (Garrett 42 p. 150). They are, however, conceptual truisms and not the usual tangible facts we find in the perceptual world. Even tests purporting to measure the same thing seldom correlate much better than do the results of intelligence tests and academic success. Correlations between standard intelligence tests and estimates of intelligence by teachers range from.56 to .61. (Pintner 83 p. 294,295). Correlations even between standard intelligence tests, and other standard intelligence tests only range from .75 to .85. (Kirkpatrick 67 p. 147). Garrett points out (42 p. 185) that the value of a prediction must depend as much upon the fineness of the units of measurement as upon the size of the error of estimate. Rogers calls attention to the fact that since the r. cannot exceed the value of the square root of the lesser reliability of the two variables, and since this is on an average .66 in educational fields, correlations are thus usually limited to a range from .00 to .81 (90 p. 758). Huffaker (55) gives us a table showing the percentages of predictability corresponding to indeces of the criterion. He says that for this reason alone predictive efficiency is forever

limited to less than 50%, probably even less than 40%; and on an average will never rise above 25% or 30%. This limitation is even more true for the other variable of our study, school marks, than it is for intelligence. Freeman (41 p. 373) finds that very low correlations "are probably due to the variation in the marking standards of different institutions". "In many subjects of instruction the methods of teaching are so faulty", says Bingham (5 p. 56) "that a perfect instrument of prediction could not correlate higher than .40 or .50 with the college result." In our study, moreover, the two variables, intelligence and marks, are not suggested to be measures of the same thing. It is merely speculated that the one accounts for certain factors of the other.v Correlations, therefore of around .50 especially those having low probable errors, are significant and need to be examined for prognosis value.

"We have shown thus far," says Wood (138 p. 139) "that the intelligence examination predicts college success very nearly as well as college success, in terms of the best available index, predicts itself from one semester to another, or from one year to another. Since a test cannot predict a criterion better than the latter forecasts itself, all hope of improvement in the intelligence tests prediction depends upon improvement in the reliability and significance of the criterion."

(2) A second cause, other than error of estimate, for lowered correlation is the skewed distribution of subjects. The full correlation can only manifest itself when there is present

a normal frequence curve. From the very beginning of our educational system there occurs a retardation and later a gradual elimination of those of lower intellectual capacity. In the college there is only a small percentage of the general population of that particular age group. This percentage is, however, not a random sampling but a highly selected classification from the highest end of the normal curve. "High correlations", says Thurstone (118 p. 168) "are not to be expected in a selected group in which the applicants with low test scores have already been eliminated." In other words, the homogeneity of the common factor in the two variables, in our case the intellectual component in the attainment of college marks, makes for lowered correlations.

(3) The third cause, other than predictive efficiency, that makes for lowered correlations is the heteregeneity of the elements present in the one variable and not tested by the other. We shall attempt to show this more in detail throughout this study. For the present it should be understood that intelligence is only a single one of the factors making for success at college and though, according to our study, and others, it seems to account for about one half of those factors, there are yet many others present in varying degrees that must not be left out of account in any finally valid prognosis.*1 Among these other factors is previously assimilated knowledge as tested by High School averages,*2

*-1 "No single factor", says Kriner (68p192) "is a reliable index to predicting teacher success". A great number of other factors than intelligence cause elimination from college (Segel 96 p.7;Dale 27), "There are many other important elements entering into success in college studies besides the one of intelligence". "Pintner 83 p.294)

*-2 Burgert 16; Johnston and Williamson 58; Drake and Hermon 31; Thurber 113; Glatfelter 45; Segel 97; Wagner 131; Jones and Laslett 61; Byrns 18.

regents marks *2, or entrance examinations either general *3, or in a specific subject.*4

It is suggested that the added element in these indices, not present in intelligence tests but found in later school marks, is what might be called "seriousness of purpose" or "habits of hard work" *5. Factors, other than intelligence, suspected of playing a part in academic marks, are the peculiar college marking system *6, the specific college situation *7, the types of subject *8, the quality of work demanded by the particular institution *9, the study methods practiced by the students *10, and personality traits such as introversion-extroversion *11.

Thus far we have defined "prognosis" as we feel it is properly used in educational practice. Briefly stated it is the examination and interpreting of the various symptoms in an individual, or a group, of future success or failure in our educational institutions, using all possible statistical devices, for the purpose of planning out in advance what our educational procedure shall be.

*2 - Wagner and Strabel 134; Wagner 131.
*3 - Johnston and Williamson 58(the Minnesota C.A.R.); Iowa Placement-Seashore 95; Wagner 131; Stoddard 101; Condit 28.
*4 - Cooperative English Test - Drake and Hermon 31; Glatfelter 45; Chemistry Aptitude Test 88.
*5 - Crawford 96 p. 23; Jones and Laslett 61 p. 271.
*6 - Stagner 99
*7 - Miner 73
*8 - Dale 27
*9 - Segel 96 p. 8
*10- Eckert and Jones 34
*11- Root 91

To what specific use we shall put our prognosis depends on what is our particular aim. Prognosis may be used to determine college admission *1. There is some disagreement as to whether an intelligence test should ever be used for this purpose *2. Pillsbury, however, points out that one of the main functions of education is selective, to pick out the intelligent individuals in the population and put them into positions of leadership.(82). Hull (56 p. 276) puts it this way. The higher percentage of rejection that is permitted the lower the useful correlation limit for that purpose. He also quotes Terman to the effect that if the Thorndike College Entrance Examination should reject all individuals showing scores of less than 90, though many fairly good students would be rejected with the weak ones, at least the number of failures would be reduced to o. A second function of prognosis is counselling, guidance, and placement in the specific field of college work for which the individual is best fitted *3. The crux of this is summed up in Pintner (83 p. 299, 300) "Men with high intelligence ratings and low college grades are reported to improve frequently when confronted with the facts. Deans and other administrative officers take the intelligence ratings into consideration when dealing with academic delinquents and cases of probation, dismissal, reinstatement, petitions to carry extra work and the like".

*1 - Segel 96 p. 1; Symonds 104 p. 606; Anderson 2 p. 420; DeCamp 28 p. 258
*2 - Tiegs and Crawford 128 p. 163
*3 - Johnston and Williamson 58 p. 738; Segel 96 p. 6; Feder 39 p. 602; Williamson 136 p. 16; Torgerson (In Pintner 83 p. 261)

A third function of prognosis is to offer criticism and suggest needed changes in courses and methods of instruction.*1

A fourth function is that college fees be charged inversely to potential worth *2. Pintner (83 O. 310) reports eighteen uses of intelligence tests in colleges covering the first three of those we have mentioned and others. Such are the goals of prognosis at the college level.

*1 - Boardman and Finch 8 p. 455.
*2 - Root 91 p. 387

B - THE AMERICAN COUNCIL ON EDUCATIONAL PSYCHOLOGICAL EXAMINATION

One of the main symptoms for an educational prognosis is the result of an intelligence examination. This today ranks in educational procedure as blood pressure does in medicine. Toops reports its official use in 1923-24 in 60 percent of 110 colleges (Pintner 83 p. 310). By 1934 Thompson can state that there are a comparatively small number of colleges in the United States not using an intelligence testing program. (111 p. 790). Some authors are extremely optimistic about its efficiency. "The intelligence test is not only as good a criterion for admission to college as any other single criterion thus far used, but it is more efficient and less expensive". (Wood 138 p. 91). We shall not attempt to define intelligence here. For definitions the reader is referred to Pintner (83 pp 47-51) and to Thurstone (114 p. 441-450). For us intelligence is the score of a freshman student on the American Council Psychological Examination which we shall later describe. Neither shall we here go into the various arguments as to the nature of intelligence and whether there is a general intelligence factor as is held by Spearman and refuted by Thorndike, Tyron and others. We shall have occasion to refer to this later in Chapter III; but for the present call attention to adequate discussions of the problem in Pintner (83 pp62-71), Thurstone(114 pp 448-450); Hildreth (52 pp 187-189), and Freeman (41 pp 480-481). We further will not in this study attempt a general bibliography of intel-

ligence testing. This is adequately presented in Pinter's book on "Intelligence Testing" (85), in his annual reports in the Psychological Bulletin (84), in Thorndike's book "Measurements of Intelligence" (118), in Hildreth's annotated bibliography (52), and briefly in the American Yearbook (50). We also exclude from this study the elementary school situation even though it includes attempts at correlating intelligence and achievement. (Pintner 85 pp 266-268; Terman 108 p. 106; and Heilman and McKee 81 pp. 184-200). We do the same with the secondary school situation. (Pintner 85 pp. 284-289; Mitchell 75 pp 577-581; and Pressey 85 pp. 381-385)/ We limit ourselves entirely to the college situation, and, in it, the relationship of intelligence tests results to marks obtained in the classroom.

Many previous studies have been carefully reviewed. We submit here a table of 121 studies - (TABLE I) made at 82 different schools, 83 or 69% of which use the American Council Psychological Examination. This table is not intended to be exhaustive. It includes merely an adequate sampling of the previous studies in order to give the reader some idea of range and tendencies. The correlations here range all the way from .11 to .77. They show a strong central tendency with a median of .433. The Q^1 was .370; the Q^3 .522, making a Q. of .076. The method of selection of this sampling was the order of reading on the subject which was entirely random.

Readings referring to many more studies, either found after TABLE I was finished, or made on the basis of other methods of

TABLE I

CORRELATIONS BETWEEN INTELLIGENCE AND GRADES FROM PREVIOUS STUDIES

INSTITUTION	REPORTER	REF.	YEAR	TEST	CORRELATTIONS
Allegheny	-	117	1928	A.C.E.P.E.	.553
Alma	Clack, R.W.	120	1930	A.C.E.P.E.	.497, .374
Amherst	Toll, C. H.	129	1928	Otis,Alpha	.58, .53, .38
Antioch	English,H.B.	118,117	1927	A.C.E.P.E.	.39
Arkansas	Jordan, A.M.	63	1920	A.C.E.P.E.	.485,.517,.813 .513,.540,.448 .415,.507,.518 .649
Arkansas	Gerberich,J.R.	120	1930	A.C.E.P.E.	.473
Baker	-	117	1928	A.C.E.P.E.	.561
Barnard	Gillis,F.M.	44	1931	Thorndike	Compares but no r.
Baylor	Allen, W. S.	121	1931	A.C.E.P.E.	.561,.423,.394, .406,.331
Brown	MacPhail,A.H.	71	1926	Brown	.371
Bryn Mawr	Crane, E.	25	1927	A.C.E.P.E.	.271,.288,.297, .333,.326,.324 .274,.295,.267 .403,.429,.266
Bucknell	Davis, F. G.	117	1928	A.C.E.P.E.	.48, .57
	Davis, F. G.	118	1927	A.C.E.P.E.	.261,.473
Buffalo	Jones, E. S.	121	1931	A.C.E.P.E.	.28,.28,.26 .21,.34,.26 .23,.37,.51

TABLE I - Continued

INSTITUTION	REPORTER	REF.	YEAR	TEST	CORRELATIONS
California	Cahoon, G. P.	120	1930	A.C.E.P.E.	.29, .40
Carleton	Todd, J. E.	121	1931	A.C.E.P.E.	.60, .57, .53 .56, .50, .58 .59
Carnegie	Cleeton, G. U.	19	1924	Thorndike	.519, .472,.482 .521, .388, .378 .442, .423
Case	Focke, T. M.	118	1927	A.C.E.P.E.	.60
Case	Focke, T. M.	117	1928	A.C.E.P.E.	.310
Centenery	Odum, C. L.	120	1930	A.C.E.P.E.	.53
Centenery	Odum, C. L.	121	1931	A.C.E.P.E.	.52, .38, .35 .35, .38, .55 .38, .52
Chicago	Thurstone,L.L.	117	1928	A.C.E.P.E.	.558, .501, .519 .478
Chicago	Thurstone,L.L.	120	1930	A.C.E.P.E.	.423
Chicago	Boucher, C.S.	12	1932	A.C.E.P.E.	.39
Chicago	Blair, J.L.	7	1933	A.C.E.P.E.	.50, .49
Colgate	Estabrooks,G.H.	120	1930	A.C.E.P.E.	.318
Colgate	Thurber,C.H.	113	1933	A.C.E.P.E.	Compares but no r.
Colorado	-	117	1928	A.C.E.P.E.	.551
Col.Teach.C.	Condit, P. H.	22	1929	A.C.E.P.E.	.417,.370,.393, .452
Col.Teach C.	Whitney, F. & Goodman, C.H.	96	1930	A.C.E.P.E.	.33
Col.Teach C.	Goodman, C. H.	120	1930	A.C.E.P.E.	.494
Columbia	-	20	1921	Thorndike	.65
Connecticut	Morris, F.E.	117	1928	A.C.E.P.E.	.36
Cornell	Freeman, F.S.	121	1931	A.C.E.P.E.	.44

TABLE I - Continued

INSTITUTION	REPORTER	REF	YEAR	TEST	CORRELATIONS
Delaware	Wilkinson,W.A.	120	1930	A.C.E.P.E.	.494
Dickinson	-	120	1928	A.C.E.P.E.	.480
Duke	Godard, J.M.	121	1931	A.C.E.P.E.	.548
Emory	Langhorne,M.C.	120	1930	A.C.E.P.E.	.55
Emporia	Vandervelde,C.	120	1930	A.C.E.P.E.	.44, .66, .63 .69, .75
Florida	Hinckley,E.D.	120	1930	A.C.E.P.E.	.477,.513,.609 .646
Grinnell	Dresse, M.	120	1930	A.C.E.P.E.	.51, .38, .54
Hawaii	Symonds, P. M.	105	1924	Thorndike	.45, .36, .42 .28, .45, .24 .32, .36, .27 .34
Hobart	-	117	1928	A.C.E.P.E.	.567
Howard	Sumner,F.C.	120	1930	A.C.E.P.E.	.55
Illinois	Odell, C.W.	96	-	Otis	.38
Indiana Norm.	Thomson, C. & Russell, D.	96	-	Otis	.43, .40
Iowa	Stoddard,G.D.	101	1925	A.C.E.P.E.	.62
				Alpha	.49
Iowa	Tallman,R.W.	106	1927	Thorndike	.453, .480,.345 .353, .574,.604 .598, .481, .571 .638, .511, .529 .409, .440, .597
Iowa Teach.	Nelson,M.J. & Denny, E. C.	120 79	1927	Terman A.C.E.P.E.	.64, .77 .51
Kalamazoo	Harper, E. B.	117	1928	A.C.E.P.E.	.45
Lehaigh	Mlick, H. N.	120	1930	A.C.E.P.E.	.46, .53
McGill	Kelleg, C. E.	65	1929	Alpha	.173,.326,.393

TABLE I -Continued

INSTITUTION	REPORTER	REF	YEAR	TEST	CORRELATIONS
Marietta	Watson,A.C.	117	1928	A.C.E.P.E.	.70
Mass. Ag.	-	117	1928	A.C.E.P.E.	.413
Mass. Ag.	Glick,H.N.	120	1930	A.C.E.P.E.	.421,.299,.345 .248,.426,.469 .347,.211,.402 .332,.352
Michigan	Brown, R. A.	120	1930	A.C.E.P.E.	.498
Michigan	Brown, R. A.	121	1931	A.C.E.P.E.	.419,.348,.398 .466,.396,.469 .457,.371,.419 .560,.390,.465
Michigan Norm.	Irion, T.W.	117	1928	A.C.E.P.E.	.52
Minnesota	VanWagenen,M.J.	96	1920	Alpha	.50
Minnesota	Johnston,J.B. & Williamson,E.G.	58	1934	A.C.E.P.E.	Compares but no r.
Missouri	Guiler, W. S.	49	1927	Terman	.49,.46,.52
				Otis	.48, .40, .49
				O. C. A.	.45, .44, .47
Mt. Holyoke	-	117	1928	A.C.E.P.E.	.445
Sophie Newcomb	-	117	1928	A.C.E.P.E.	.247
New Hampshire	-	117	1928	A.C.E.P.E.	.303,.295
N. Y. Regents	Jones, E.S.	60	1928	A.C.E.P.E.	.55, .45
New York	Fryer, D.	117	1928	A.C.E.P.E.	.315
Northwestern	Kent, R. A.	66	1928	A.C.E.P.E.	Compares but no r.
Oberlin	Hartson, L.S.	49	1928	A.C.E.P.E.	.50, .53
Ohio State	Bridges, J.W.	13	1920	Alpha	.35,.54,.39 .27,.35,.22 .25,.52

TABLE I - CONTINUED

INSTITUTION	REPORTER	REF.	YEAR	TEST	CORRELATIONS
Ohio State	Neuberg, M.J.	96	-	O.S.P.T.	.47
Ohio State	Edgerton & Toops	96	1929	O.S.P.T.	.45
Oregon	Taylor, H.R.	120	1930	A.C.E.P.E.	.425,.440,.345 .466,.569,.484
Pennsylvania	DeCamp,J.E.	28	1921	Alpha	.41
				A.C.E.P.E.	.32
				Binet	.17
Penn. State	Hill, H.D.	96	-	Otis	.20,.34
Pittsburgh	Ernst,J.L.	38	1923	Alpha	.53,.33,.40 .41,.73,.11 .38,.52
Pittsburgh	Crauder, D. & Root, W. T.	47	1927	A.C.E.P.E.	.51
Pittsburgh	Rhinehart,J.B.	89	1933	Binet	Compares High
				A.C.E.P.E.	but no r.
Pomona	-	117	1928	A.C.E.P.E.	.572,.541
Pudget Sound	Edwards,M.	120	1930	A.C.E.P.E.	.68
Purdue	Remmers,H.H.	96	1927	A.C.E.P.E.	.45
Purdue	Remmers,H.H.	96	1929	A.C.E.P.E.	.45
Purdue	Stalnaker,J.M.	100	1928	A.C.E.P.E.	.57
Purdue	Stalnaker,J.M.	120	1930	A.C.E.P.E.	.57,.478,.387
Rhode Island	Rhinehart,J.B.	89	1933	A.C.E.P.E.	.484
Ripon	-	117	1928	A.C.E.P.E.	.464
Rochester	Klain,Z.	117	1928	A.C.E.P.E.	.426

TABLE I - CONTINUED

INSTITUTE	REPORTER	REF.	YEAR	TEST	CORRELATIONS
Stanford	Terman, L.M.	109	1921	Alpha	.52,.43,.31
				Terman	.54
				Thorndike	.51,.60
State Teach,Cal	Groves,J.W.	120	1930	A.C.E.P.E.	.59
Stephens	Shafstall,W.P.	121	1931	A.C.E.P.E.	.54,.38,.54 .51,.618
Swarthmore	-	117	1928	A.C.E.P.E.	.445
Transylvania	Reeves,F.W.	117	1928	A.C.E.P.E.	.31,.42,.52
Tufts	-	117	1928	A.C.E.P.E.	.458
Vanderbilt	Bugg, E.G.	120	1930	A.C.E.P.E.	.622,.615, .625
Virginia	Ferguson, G.O.	117	1928	A.C.E.P.E.	.57
Virginia	Ferguson, G.O.	120	1930	A.C.E.P.E.	.57 (same?)
Washington	Dvorak, A. & Salzer, R.	58	1933	Washington	.37
Wash. & Jef.	Basel, D.M.	121	1931	A.C.E.P.E.	.565
Wells	-	117	1928	A.C.E.P.E.	.495
Wilson	-	117	1928	A.C.E.P.E.	.595
Winona	-	117	1928	A.C.E.P.E.	.487
Wisconsin	Nelson, M.J.	79	-	Thorndike	.56,.37,.55
Wisconsin	Hannon,V.A.C.	120	1930	A.C.E.P.E.	.58,.51,.60 .52
Wisconsin	Byrns, R.K.	18	1932	O.S.P.T.	.48,.43,.36
Wittenberg	-	117	1928	A.C.E.P.E.	.532,.512,452
Wyoming	Housser, W.C.& Brinegar V & Frank, G.	88	1934	O.S.P.T.	.425

TABLE I - CONTINUED

INSTITUTION	REPORTER	REF.	YEAR	TEST	CORRELATIONS
Yale	Anderson,J.E.	8	1920	Alpha	.38
Yale	Crawford,A.B.	98	1929	Alpha	.57,.43,.36, .40,.32
Yale	Crawford,A.B.	26	1930	Alpha	.49
-	Binnewies,W.G.	6	1923	Miller	.43
				Otis	.39
				Terman	.49
-	Bridges, J.W.	14	1920	Alpha	.35
			1922	Thorndike	.40
-	Bolenbaugh,L.& Proctor, W.	9	1927	Thorndike	.45,.37
-	Grauer, D. & Root, W.	47	1927	Thorndike	.39
-	Hopkins, L.T.	54	1929	A.C.E.P.E.	.53
-	Miner, J.B.	74	1927	Alpha	.50
-	Root, W.T.	92	1923	A.C.E.P.E.	.51
-	Segel, D.	97	1931	A.C.E.P.E.	.48
-	Stone, C.L.	102 & 103	1922	Alpha	.44,.50

comparison than that of the statistical correlation, are included in the footnote.* These widely separated studies are difficult to compare, for they use different psychological tests, different modes of computing grades, different classes at different institutions, and different forms of subject selection. There is nothing gained, therefore, through a more nearly complete sampling nor through further statistical procedure with the data here assembled.

In our study we use, as the measure of intelligence as has been indicated above, the American Council on Education Psychological Examination. It is produced in annual forms so that each incoming Freshman class may have a completely new test, thus insuring training for it shall have no effect on the results. The first of these forms was made possible by a grant from "The Commonwealth Fund". It was assembled in 1924 as the result of the very careful labors in intelligence testing of six outstanding psychological scholars, L. L. Thurston of Chicago University, S. C. Dodd of Princeton University, T. G. Thurstone of Chicago University, A. W. Kornhauser of Chicago University, C. C. Brigham of Princeton University, and C. Burt of London University. They worked together for this purpose, as members of the "National Research Council Committee of Personnel Research" for the American Council on Education in Washington. Their results

* Wood 138 pp/ 69-91; Pintner 83 pp 292-315; Segel 96; Terman 109; Hildreth 52; Also Beatty and Cleeton 4; Burgert 16; Byrns and Henmon 17; Douglass and Michaelson 30; Drake and Henmon 31; Drake and Winn 32; Eells 35; Ficken 40; Glatfelter 45; Krimer 68; Meyse 77; Payne and Perry 81; Root 91; Wagner 132; Wilson and Hodges 137.

were printed and distributed at cost with the idea that, in this way, there could be a very large sampling of students and institutions. Thereby there might be established adequate norms.(121) The examination each year has consisted of a battery of various types of intelligence tests. In all thirteen different kinds of tests have been tried. Five of these proved in the first few years to be more effective than the others; and from 1927 up to and including the last test of 1936 have constituted the complete batteries. Four of these tests have appeared constantly since the beginning in 1924. They are the artificial language test, the arithmetic test, the completion test, and the opposites test. The fifth, an analogies test, was included for the first time in the 1925 edition, was omitted in 1926 and has appeared continuously since 1927. (119). This makes possible the comparison of the annual norms and the equating of scores since 1927 (115-127). Each of these tests is supposed to measure some specific quality of educational capacity. The corresponding parts of the separate editions of the total examination are accordingly presumed to have, and actually have shown themselves to have, very high correlations. The items of each test are ranged in the order of their difficulty, so that stopping at any one point is the practical equivalent of not being able to do any of the problems of that group further on. This tends to equate the time element and the difficulty element under the presumption,on the part of the authors, that speed and ability are

closely related.* The completion test consists of a series of definitions, the word defined being omitted. The student is required to fill in this word. The artifical language test consists of a vocabulary for a fabricated language with simple grammatical rules for converting verbs in the present tense into pasts and futures, nouns and their plurals, adjectives and adverbs, together with sentences which are to be translated accordingly. The analogies test consists of series of four geometric figures the first of which is to the second, as the thrid is to the proper one of a multiple choice. The arithmetic test is a graded arithmetic problem test. The opposites test presents a series of four word groups, two of each being either synonymous or antinonmous, the proper solution being to note down the numbers of this pair in the appropriate column. Each year are published norms of the preceding year's edition, on the basis of as many schools as will report. In the reports of later years there are also included the equated scords of the various annual forms. (115-127). In some of these reports there are also presented results of research in the relationship of test results and later college grades. In TABLE II are shown the number of copies printed each year, the number of institutions using them, and the number of students for which norms are available. Norms for the form given in September 1936, covering 304 institutions and 66,111 students show that this examination is becoming the standard intelligence test for university entrance (127). The 1933 edition (124) in which we are

*See Pintner 83 p. 54

TABLE II

USE MADE OF THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION

YEAR	REFERENCE	COPIES SOLD	INSTITUTIONS ORDERING	INSTITUTIONS REPORTING	NUMBER OF STUDENTS
1924	115		109	25	5,816
1925	116		166	55	15,000
1926	118			26	5,200
1927	117			68	16,554
1928	119	85,040	276	112	30,653
1929	120	109,855	285	94	25,524
				(Same but incom.)	34,507
1930	121	138,407	347	137	36,479
1931	122	(This information not given)			
1932	123	(This information not given)			
1933	124	121,757	399	203	40,229
1934	125	150,226	423	240	52,435
1935	126	189,506	493	266	58,402
1936	127	209,969	562	304	66,111

most interested since it provides the basis of our study has norms available for 805 institutions and for 40,829 students. The Louisiana State University median 129.79 is considerably below the national median, 155.20. This is true also of the median found in the parts of the test*. There are several institutions with median scores over 200. This suggests that Louisiana State University is not quite as selective as the average institution.

*	National Median	LSU Median
Arithmetic	27.97	27.05
Opposites	38.35	31.08
Completion	31.16	25.78
Artificial Language	26.47	26.00
Analogies	37.95	23.60
Total	155.20	129.79

C - PROJECT

In this section we shall explain specifically our method of research.

The blank form (Table III) was devised for recording data from the records of the Lower Division and those of the Registrar. From the former we obtained the sex, high school from which graduated, the age in years and months, the place of birth, and the father's occupation, together with the raw scores on each of the five parts of the American Council Education Psychological Examination and their sum.

From the Registrar's office we obtained the home town, religion, a check on age and father's occupation, and also the grades in all subjects for all available semesters in terms of grade letters (A, B, C, D, E and F). We had to convert letter grades into number grades. We did this by an adapted point-hour ratio. The University, for purposes of graduation and honors, counts the A's 3, B's 2, C's 1, and D's 0. The E's and F's are dropped from consideration entirely. We hoped to obtain a more nearly accurate estimate of true grades by counting each E-1 and each F-2.* We carried through our ratio between number of hours taken and the grading on this basis for each semester, for each subject, for several groupings

*Our very tedious procedure was evidently not warranted. We obtained a correlation between the total examination and first semester grades of .408. Moyse (77) using the same data, but with the regular point-hour ratio, reports a much higher correlation of .609. The reason for this discrepancy is probably that Moyse used the unselected group, we only the continuing.

TABLE III

Roe, Richard — Name
Doeville, La. — Home Town
M — Sex

AMERICAN COUNCIL OF EDUCATION
PSYCHOLOGICAL EXAMINATION
(AT LOUISIANA STATE UNIVERSITY)

Doeville, H.S.

Baptist

Age: 17 Yrs, 5 Mo.
Born: Louisiana
Father: Railroad

PART I	PART II	PART III	PART IV	PART V	TOTAL
56	72	46	53	42	249
1/98	1/98	1/92	3/71	2/90	1/96

FRANKLIN PRESS

Notations	SUBJECTS	19	F 33	S 34	F 34	S 35	F 35	S 36	SUMS	TOTAL	
1.50			C5	B5	C2	C2			B5 xC7	15	10
2.00	ENGLISH and Literature		B5	B5	B5	B5			B12	24	12
2.50	LANGUAGES (General)									15	6
2.50	French		B5	A5					A5 B5	15	6
	German										
	Greek										
	Italian										
	Latin										
	Spanish										
2.00	MATHEMATICS				B5	B5			B6	12	6
	NATURAL SCIENCES (General)										
	Astronomy										
	Botany										
2.50	Chemistry		A4	B4					A4 B4	20	8
	Geology										
	Physics										
	Zoology										
	PHILOSOPHY										
2.75	PHYSICAL EDUCATION & Mil. Sci		A1	A1	B1	B1	A2	A2	A6 B2	22	8
	PSYCHOLOGY										
	RELIGION										
1.68	SOCIAL SCIENCES (General)		A3	A3					A6B7C15	47	28
	Anthropology										
1.32	Economics				C6	B5 C5	B2 C5	B2 C5	B7 C15	29	22
	Geography										
	Government										
	History										
	Sociology										
TOTALS	ACADEMIC SUBJECTS									153/78	
1.96											
	AGRICULTURE & Agricult. Ed: & Agron. & An. Ind. & An. Path. & Dairy & Forest. & Hort. & Poul.										
	ENGINEERING—Aeron. & Civil & Electric. & Mechanical & Eng. Mechanics & Eng. Draw.										
	EDUCATION										
	HOME ECONOMICS										
	JOURNALISM										
	MUSIC & Ensemble & Organ & Piano & Violin & Voice, etc.										
Miscel. 2.16	Business Administration				A5	B5	A5 B6C2	A3B6C2	A9B15C4	61	28
TOTALS	PROFESSIONAL SUBJECTS										
TOTALS 2.02	ALL SUBJECTS		2.29	2.41	1.72	1.72	2.00	2.00		214/106	

1. A8 B6 C3 = 39/17
2. A7 B10 = 41/17
3. B13 C5 = 31/18
4. B13 C5 = 31 / 18
5. A5 B8 C5 = 36 / 18
6. A5 B8 C5 = 36 / 18

of subjects, as well as for the total grade score of all subjects, as well as for the total grade score of all subjects for all of the six semesters considered. Each score used, therefore, is a separate quotient and not the sum or the average of other quotients. We omitted from consideration all courses that were marked either "Withdrawn" or "Incomplete". We counted all summer work or absentee work into the closest preceding Semester. We used the results of six semesters. The last two semesters' records were not yet available. First the letter grade together with the number of credit hours for which assigned was placed in the appropriate square of the blank. The summation of the number of hours per letter for each subject was placed in the next to last column of the blank; and the number of hours per letter per each Semester was placed at the bottom of each Semester column. Each of these summations was then converted into the numbers according to the foregoing plan and then averaged, the final averages being placed, for subjects, to the extreme left, and for the Semester, on the bottom of the sheet. The point-hour ratio thus established for the total subjects counting by subjects and for the total subjects counting by Semesters necessarily had to be equal. This gave us a check on our arithmetic processes as we completed each blank.

The correlations were all made by the Product-Moment Method with the use of Otis correlation charts. We used as the measure of all central tendency of intelligence or grades, the mean; and for measuring distribution the standard deviation.*

*In this study the median on the psychological examination 129.79 is considerably below the man, 137.74

All filled in blanks and all correlation charts are being kept on file for any future references and may be used, on request, in connection with any possible future studies.

The most important comparison for our study is that of the scores on the whole examination with the grade ratios on all subjects for all semesters. This forms our measuring rod for all of the other comparisons we make. It is made on the basis of 427 of the 815 cases, those who were still in the University in the fourth year since their arrival. They show a psychological mean of 137.74 with a standard deviation of 56.00; and a grade mean of 1.31, (that is somewhat over C) with a standard deviation of .69. The correlation between the two is .530 with a Probable Error of .026. The large number of students involved, together with the large number of credit hours* from varied courses and subjects tend to average out the differences making this a norm from which we can gather comparisons for our other results. Now our main purpose is to secure more homogeneous groupings of our data and find what effect this has on our more general norm. Wagner and Strabel have studied this effect on the prognosis value of other tests; but, in their study, they left intelligence test results out of consideration (132). It must be understood that "homogeneity" here refers to factors entering into the grade ratio other than intelligence. It has previously been ascertained that homogeneity of the intelligence factor reduces the correlation between intelligence and grade scores. (Jones 59; Pintner 83 p. 294)

*There are for individual cases an average of approximately 100 credit hours involved making for all cases somewhere around fifty thousand. This means that the correlation is much more reliable than even the small Probable Error would indicate.

To this end we shall consider eliminated students, separate semesters of work, specific subjects, various groupings of subjects, scores on parts of the psychological examinations, specific groupings of the students in respect to age, sex, hometown, father's occupation, creed, intended occupation, and athletic leaning. From each of these homogeneous groupings there is produced a separate correlation between intelligence and grade ratios, one hundred ten of them in all. These are grouped in tables in the next three chapters. There are other tables showing the related previous studies for purposes of comparison. The emphasis of this study is in the data of these tables and not in the accompanying suggested explanations of some of their eccentricities.

C H A P T E R - T W O

STUDY

OF

ELIMINATION SEMESTERS AND SUBJECTS

RELATIVE TO

TOTAL A. C. E. P. E. SCORES

ELIMINATION

Table IV contains the scores on the psychological examination of eliminated students, continuing students, and both. The mean intelligence of the eliminated students is lower than that of all those examined and much lower than that of all those examined and much lower than that of the continuing. 388 or 48% of the original 815 dropped out. 427 or 52% continued. The approximate half who were eliminated had a mean intelligence of 119.84. The approximate half who continued had a mean intelligence of 136.75. The difference is 16.91. The sigma of the continuing is 56.00. The mean of the eliminated group is .302 sigma below the mean of those continuing. There may be other reasons present, but the indication here is that higher intelligence is an important factor in continuation. (Chapter V Conclu.)* Could we separate those who went to other schools, and those who left for financial reasons, we might find this difference even more significant. Individual cases show that intelligence is only one of several causes, however. Of the six over 300, three were eliminated or 50%. Of the two under 80 both were eliminated; but of the 15 under 40, 6 or 40% continued. Further we see that of those having a score under 100, 117 or 42% continued; while of those having a score over 200, 38 or 38% were eliminated. These figures show that while the tendency toward elimination of the less intelligent is pro-

* See also Drake and Winn 32; Terman 109 p. 491; Pintner 83 p. 308

40

TABLE IV

A. C. E. P. E. AND ELIMINATION

A. C. E. P. E. SCORES

	)0 - 19	20- 39	40- 59	60- 79	80- 99	100- 119	120- 139	140- 159	160- 179	180- 199	200- 219	220- 239	240- 259	260- 279	280- 299	300- 319	NO.	MN
ELIMINATED	2	7	33	54	65	58	50	34	30	17	19	8	5	4	1	3	388	119.84
CONTINUING	0	6	27	34	50	64	58	49	50	28	25	15	14	3	1	3	427	135.75
TOTAL	2	13	60	88	115	122	108	83	80	45	44	23	17	7	2	6	815	129.95

nounced, one cannot predict what is going to happen to individuals. Segel (96 p.7) calls attention to the fact that there are a great number of other factors than intelligence causing elimination from college. The statement that "tests have been and will be devised to meet the college situation and enable us to eliminate in advance many of the men who are now 'misfits' in our educational scheme" (Anderson 2 p. 420) is, therefore, altogether overly optimistic. Two studies at high school level, though not strictly in point, seem to emphasize the same thing. That of Rundquist (94 O. 304), showing an increase of the intelligence level with an increase of the numbers of those remaining at school during the depression years, proves that elimination may work contrary to expectation and remove the brighter students. That of Goodman (46) shows only an insignificant difference in the I. Q. of those who graduate after failing two or more courses and those who do not*. We see, therefore, that whereas the general rule is true that eliminated students are also intellectually inferior students, exceptions are many. We shall have occasion to point out some specific exceptions later.

*Compare with Strabel (104) where students who are warned are but slightly lower on the psychological examination than those who are not.

B - SEMESTER CHANGES

Changes from semester to semester are recorded in Table V and similar studies by others in Table VI. There are very definite changes in correlations from semester to semester, an increase up to the third semester, and a decrease thereafter. There is a fall in the grade ratio in the same semester that there is the highest correlation. This would indicate that the differences from semester to semester may have something to do with lack of marking standardization. (See Chapter V Concl. vi and vii). In the first two semesters a system of standardized tests was consistantly used in most subjects. These are conducted through the Lower Division which has supervision of the first year's work. After the first year students who do fair work are released to other schools of the University where as yet tests are not standardized. The presumption is that the correlation of the first two semesters should be more accurate than the others. This cannot be proved*. Correlation of intelligence and all semesters' grade ratios is larger than that for any one semester. Whenever, throughout this study the number of credit hours involved is small, the normalcy of the correlation suffers accordingly. The very large standard deviation in the first semester also demonstrates a slowness with which the new student accommodates himself to his proper stride. Here, too, the distribution of grades for all semesters is

*The size of the correlation is no indication of its accuracy.

TABLE V

A. C. E. P. E. AND GRADE SCORES

BY

SEMESTERS

SEMESTER	NO. CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN GRADES	SIGMA GRADES	CORRE-LATIONS	P. E.
First	427	136.74	55.90	1.40	1.15	.408	(.027)
Second	427	136.74	55.90	1.45	.74	.502	(.024)
Third	421	136.75	56.20	1.16	.89	.510	(.027)
Fourth	481	136.98	55.80	1.34	.75	.416	(.027)
Fifth	397	137.86	56.28	1.37	.80	.376	(.029)
Sixth	396	137.98	56.00	1.35	.79	.403	(.028)
TOTAL Continuing	427	137.74	56.00	1.31	.69	.530	(.026)

TABLE VI

CORRELATIONS BY PERIODS

PREVIOUS STUDIES

REPORTER	REF.	FRESHMAN GRADES	ENTIRE COURSE
TOLL	129	.25, .27, .28	.16, .19, .34

REPORTER	REF.	FIRST SEMESTER	SECOND SEMESTER	BOTH
BROWN	121	.419	.348	.314

REPORTER	REF.	FRESHMAN YEAR	SOPHOMORE YEAR	BOTH
GLEETON	19	.519, .472, .482 .521	.368, .378	.442, .423

REPORTER	REF.	CLASS	FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	TOTAL WORK
Andersen and Spencer	3	1923	.406	.322	.342	.303	.376
		1924	.377	.339	.367	.364	.370
		1925	.391	.317	.380	.323	.367

REPORTER	REF.	FIRST SEMESTER	SECOND SEMESTER	THIRD SEMESTER	FOURTH SEMESTER	FIFTH SEMESTER	SIXTH SEMESTER	SEVENTH SEMESTER	EIGHTH SEMESTER
Miner	96	.50	.37	.07	.32	.29	.26	.30	.25

TABLE VI - Continued

REPORTER	REF.	YEAR	FIRST YEAR	FIRST TWO YEARS	THREE YEARS	THREE AND A HALF YEARS	FOUR YEARS
Crane	25	1924	.271	.288	.297	.233	.326
		1925	.324	.274	.295	.267	
		1926	.403	.429			

REPORTER	REF.	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR	COMPLETE
Tallman	106	.511	.529	.409	.440	.597

REPORTERS	REF.	FIRST YEAR	SECOND YEAR	THIRD YEAR
Kellog & McGill	65	.173	.326	.393

SCHOOLS	REF.	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR	COMPLETE
Emporia	120	.44	.66	.63	.69	.745
Mass. Ag.		.421	.299	.345	.248	.426

much narrower than for any particular semester. Since approximately the same students are considered for all semesters there is no significant change in the intelligence scores or their distributions.

A point made in our introductory chapter is also illustrated here. The Probable Error alone is not indicative of the full significance of the correlation. The Probable Error is based statistically on the number of students; while, in reality, the significance of the correlation varies also by the number of credit hours involved. Around 400 students are under consideration in each of the semesters. The number of credit hours, however, in any one semester is around 17 per student, making a total of around s even thousand for all students. But in the six semesters, the number of credit hours is around 100 per student making a total of around forty thousand credit hours for all students. The correlation with total scores is, therefore, far more nearly accurate and can be considered for the purpose of this study as normal.

The results of previous studies show no consistant tendencies. They do, however, record variations in correlations between the intelligence and grades of the same students at different times. This is also found in the lower school situation by Line and Glen (69). They blame the discrepancy on "school procedures". Feder, who used other than the intelligence test for college prognosis, found a diminishing of the value of his predictive instruments, slightly after the first semester, and

and markedly after the first year. (39 p. 600). Our diminishing, if it be the same phenomenon, does not occur until much later.

C - SCORES IN VARIOUS SUBJECTS

Comparisons between the psychological examination and grade point ratios in specific subjects are recorded in Table VII through X. Table VII contains reports on all specific subjects taken by the 427 continuing students. The normal or total continuing mean of intelligence is 136.74. The following subjects, in order from the highest, show intelligence means above the normal:- Latin, Art, Religion, Philosophy, Astronomy, German, Anthropology, Government, Economics, French, Engineering, Mathematics, Chemistry, Business Administration, Physics, Psychology, Physical Education, and English. The following subjects, in order from the lowest, show intelligence means below normal:- Italian, Agriculture, Botany, Spanish, Home Economics, Education, Geography, Geology, Journalism, Music, Zoology, Greek, Speech, History, Economics. Certain subjects seem to be elected by the better students; certain by the duller ones*. No subject is one sigma or over distant from the mean. Subjects above .2 of a sigma above the normal mean are Latin, Art, Religion, Philosophy, Astronomy, German, Anthropology, Government, and Sociology. French is the only subject between .1 and .2 sigma above the mean. The highest

*Gillis (44) finds also that certain subjects are selected by the brighter students though his are not the same subjects. Physics, Anthropology, Mathematics, Zoology, Psychology, and English are selected by the brighter students. Art, Music and the classics are selected by the worse students. The former part agrees with our findings, the latter materially disagrees.

TABLE VII

A. C. E. P. E. AND GRADE SCORES

BY

S U B J E C T S

SUBJECT	NO. OF CASES	MEAN A.C.E.P.E	SIGMA A.D.E.P.E	MEAN SCORE	SIGMA SCORE	CORRE-LATION	P. E.
Agriculture	49	106.73	53.68	1.57	.71	.563	(.100)
Anthropology	16	155.00	42.88	1.10	1.08	.388	(.141)
Art	8	177.50	64.00	1.69	.66	.971	(.014)
Astronomy	1	170.00	40.00	2.50	.00	-	-
Botany	127	119.61	49.70	1.30	.48	.680	(.032)
Business Ad	115	139.22	53.02	1.10	1.09	.486	(.048)
Chemistry	258	139.69	58.98	1.40	1.16	.416	(.034)
Economics	165	136.55	49.14	1.23	.95	.437	(.042)
Education	91	130.00	61.68	1.64	.59	.384	(.060)
Engineering	120	141.83	58.52	1.08	.84	.238	(.031)
English	427	136.75	55.92	1.21	.79	.583	(.021)
French	177	143.90	39.06	1.58	1.10	.468	(.040)
Geography	29	130.70	43.48	1.11	1.33	- .091	(.123)
Geology	43	131.49	55.06	.91	1.13	.423	(.084)
German	57	156.67	60.46	1.18	1.35	.628	(.053)
Government	110	149.27	53.32	1.54	.81	.506	(.048)
Greek	7	133.71	32.94	1.55	1.67	.704	(.129)
History	251	136.22	55.84	1.39	1.00	.489	(.032)
Home Ec.	27	130.00	50.92	1.45	.60	.488	(.099)
Italian	2	90.00	20.00	2.00	.50	1.000	(.000)

SUBJECT	NO. OF CASES	MEAN A.C.E.P.E	SIGMA A.C.E.P.E	MEAN SCORE	SIGMA SCORE	CORRELATION	P. E.
Journalism	68	131.76	54.66	1.16	.89	.451	(.065)
Latin	24	186.70	47.16	1.89	.49	- .212	(.076)
Mathematics	276	140.44	54.22	1.16	1.00	.397	(.034)
Music	122	132.62	62.10	2.45	.91	.117	(.052)
Philosophy	14	170.00	35.46	2.06	.75	.212	(.172)
Phys.Ed &M.S.	410	137.12	55.72	1.95	.66	.382	(.028)
Physics	149	139.04	54.72	1.02	1.07	.748	(.024)
Psychology	178	137.64	56.12	1.44	.82	.439	(.041)
Religion	14	171.43	78.80	2.17	.74	.897	(.034)
Sociology	98	148.16	62.20	1.35	.92	.482	(.052)
Spanish	50	125.60	50.68	1.01	1.31	.437	(.077)
Speech	194	134.95	57.86	1.73	.82	.530	(.035)
Zoology	244	132.95	55.58	1.45	.94	.479	(.033)
TOTAL (Continuing)	427	136.74	56.00	1.31	.69	.530	(.026)

TABLE VIII

A. C. E. P. E. AND GRADE SCORES

BY SUBJECTS ORDER OF "r" SIZE

(Where "r" - 4 times P. E. and .10 Distant "r" with total)

SUBJECTS	NO. CASES	MEAN A.C.E.P.E	SIGMA A.C.E.P.E	MEAN SCORE	SIGMA SCORE	CORRE-LATIONS	P. E.
Art	8	177.50	64.00	2.69	.66	.971	(.014)
Religion	14	171.43	78.80	2.17	.74	.897	(.034)
Physics	149	139.04	54.72	1.08	1.07	.748	(.024)
Greek	7	133.71	32.94	1.55	1.67	.704	(.129)
Botany	127	119.61	49.70	1.30	.48	.690	(.032)
Geology	43	131.49	55.06	.91	1.13	.423	(.084)
Chemistry	258	139.69	58.98	1.40	1.16	.416	(.034)
Mathematics	276	140.44	54.22	1.16	1.00	.397	(.034)
Education	91	130.00	61.68	1.64	.59	.384	(.060)
Phys.Ed &MS	410	137.12	55.72	1.95	.66	.382	(.028)
Engineering	120	141.83	58.52	1.08	.84	.238	(.031)
TOTAL (Continuing)	427	136.74	56.00	1.31	.69	.530	(.026)

TABLE IX

A. C. E. P. E. AND GRADE SCORES

ORDER OF "r" VALUE

(WHERE NO. CASES OVER 90)

SUBJECT	NO CASES	MEAN A.C.E.P.E	SIGMA A.C.E.P.E	MEAN SCORE	SIGMA SCORE	CORRE-LATION	P. E.
Physics	149	139.04	54.72	1.02	1.07	.748	(.024)
Botany	127	119.61	49.70	1.30	.48	.680	(.032)
English	427	136.75	55.92	1.21	.79	.583	(.021)
Speech	194	134.95	57.88	1.73	.82	.530	(.035)
Government	110	149.27	53.32	1.54	.81	.506	(.048)
History	251	136.22	55.84	1.39	1.00	.489	(.032)
Business Adm.	115	139.22	53.02	1.10	1.09	.486	(.048)
Sociology	98	148.16	62.20	1.35	.92	.482	(.052)
Zoology	244	132.95	55.58	1.45	.94	.479	(.033)
French	177	143.90	39.06	1.58	1.10	.468	(.040)
Psychology	178	138.64	56.12	1.44	.82	.439	(.041)
Chemistry	258	139.69	58.98	1.40	1.16	.416	(.034)
Mathematics	276	140.44	54.22	1.16	1.00	.397	(.034)
Education	91	130.00	61.68	1.64	.59	.384	(.060)
Phys.Ed & MS	410	137.12	55.72	1.95	.66	.382	(.028)
Engineering	120	141.83	58.52	1.08	.84	.238	(.031)
Music	122	132.62	62.10	2.45	.91	.117	(.052)
TOTAL (Continuing)	427	136.74	56.00	1.31	.69	.530	(.026)

TABLE X

SUBJECTS AND INTELLIGENCE

(FROM PREVIOUS STUDIES)

SUBJECT	REPORTER	REF.	YEAR	CORRELATION	MEDIAN	OUR STUDY
English	Boucher,C.S.	12	1932	.37		
	Ferguson,G.O.	117	1928	.63		
	Glick, H.N.	120	1930	.471,.235		
	Jordan, A.M.	97	1920	.517		
	Lefever,D.W.	96	-	.19		
	MacPhail,A.H.	102	1926	.371		
	Odum, C.L.	121	1931	.52		
	Perrin,F.A.C.	83	-	.72		
	Root, W. T.	92	1923	.40, .45		
		83	1931	.38		
	Segel, D.	97	1931	.40		
	Stoddard,G.D.	101	1925	.25		
	Stone, C.L.	102	1922	.50		
	Thurstone,T.H	119	1931	.52, .41		
	Wagner,M.E.& Strabel,E	133	1937	.35		
	Wilson College	117	1928	.56	.403	.583
French	Boucher, C.S.	12	1932	.35		
	Ferguson,G.O.	117	1928	.51		
	Odell, C.W.	96	-	.32		
	Root, W. T.	83	1923	.40, .45		
	Stone, C.L.	102	1922	.30		
	Tharp, J.B.	110	1927	.32		

TABLE X - Continued

SUBJECT	REPORTER	REF.	YEAR	CORRELATIONS	MEDIAN	OUR STUDY
French	Wagner,M.E. &Strabel,E	134	1935	.14		
	Wilson Col.	120	1928	.71 .350	.350	.468
German	Boucher, C.S.	12	1932	.32		
Root, W. T. -/		92	1923	.50		
	Stone, C. L.	102	1922	.36		
	Wagner,ME & Strabel,E	134	1935	.39 .375	.375	.628
Spanish	Boucher,C.S.	12	1932	.18		
	Odell, C.W.	96	-	.27		
	Lefever,D.W.	96	-	.24		
	Root, W.T.	92) 93)	1923	.47, .67		
	Stone,C.L.	102	1922	.12	.255	.437
Latin	Odell, C. W.	96	-	.41		
	Wagner,M.E.& Stradel,E	134	1935	.26		
	Wilson Col.	117	1928	.445	.41	-.212
Mathematics	Boucher,C.S.	12	1932	.45		
	Bugg, E. C.	120	1930	.545		
	Douglass,H.R.& Michaelson,J.H	30	1936	.258		
	Ferguson, G. O.	117	1928	.45		
	Glick,H.N.	120	1930	.473, .346		
	Jordan, A.M.	97	1920	.213		
	Lefever, D.W.	96	-	.24		
	Odell, C. W.	96	-	.31		

TABLE X- Continued

SUBJECT	REPORTER	REF.	YEAR	CORRELATIONS	MEDIAN	OUR STUDY
Mathematics	Odum,C.L.	121	1931	.35		
	Perrin,F.A.C.	83	1931	.80		
	Remmers,H.H.	96	1929	.46		
	Root, W. T.	92	1923	.39, .58, .51,.61		
	Stoddard,G.D.	101	1925	.23		
	Stone,C.L.	102	1922	.38		
	Thurst. & Thurst.	119	1931	.35	.385	.397
Psychology	Kellogg,C.E.	65	1929	.387		
	Miller, W. S.	83	-	.37		
	Nelson	79	1927	.64, .77, .51		
	Odum,C.L.	121	1931	.38		
	Spence,R.B.	83	-	.42, .61		
	Todd, J.E.	65	1929	.387	.420	.439
Botany	Glick,H.N.	120	1930	.401		
	Odell,C.W.	96	-	.20		
	Perrin,F.A.C.	83	-	.72	.401	.680
Biology	Odell,C.W.	96	-	.20		
	Odum, C.L.	121	1931	.38		
	Perrin,F.A.C.	83	-	.78		
	Root,W.T.	92 83	1923 -	.49, .52 .50, .73		
	Stone, C.W.	102	1922	.22		
	Thurst. & Thurst.	119	1931	.55	.510	.479

TABLE X - Continued

SUBJECT	REPORTER	REF.	YEAR	CORRELATION	MEDIAN	OUR STUDY
Chemistry	Ferguson,G. O.	117	1928	.41		
	Glick, H. N.	119	1930	.302,.361		
	Lefever,D.W.	96	-	.24		
	Odum, C. L.	121	1931	.55		
	Perrin,F.A.C.	83	-	.69		
	Remmers, H. H.	96	1929	.38, .41		
	Reusser, Et Al	88	1934	.425		
	Root, W. T.	92	1923	.43		
	Stone, C. L.	102	1922	.31		
	Thurst.& Thurst.	121	1931	.55	.41.	.416
Physics	Boucher,C.S.	12	1932	.55		
	Perrin, F.A.C.	83	1923	.78		
	Root, W. T.	92	1923	.50		
	Stone	102	1922	.44	.525	.748
History	Jordan, A. M.	97	1920	.540		
	Odum, C. L.	121	1931	.35		
	Perrin, F.A.C.	83	-	.76		
	Root, W. T.	83	-	.43, .48		
	Stone, C. L.	102	1922	.31	.455	.489
Economics	Boucher, C. S.	12	1932	.80		
	Odell, C. W.	96	-	.28	.34	.437
Government	Boucher, C.S.	12	1932	.20		
	Odell, C. W.	96	-	.33	.265	.506
Geology	Perrin, F.A.C.	83	-	.65	.65	.423
Education	Perrin,F.A.C.	83	-	.66	.66	.384
Human Progress-Root, W. T.		83	-	.69	.69	-

TABLE XI

A. C. E. P. E. AND GRADE SCORES

IN

PROFESSIONAL SUBJECTS

SUBJECT	NO. CASES	MEAN A.C.E.P.E	SIGMA A.C.E.P.E	MEAN SCORE	SIGMA SCORE	CORRELATION	P. E.
Art	8	177.50	64.00	1.69	.66	.971	(.014)
Business Adm	115	139.22	53.02	1.10	1.09	.486	(.048)
Home Ec.	27	130.00	50.92	1.45	.60	.482	(.099)
Journalism	68	131.76	54.66	1.16	.89	.451	(.065)
Education	91	130.00	61.68	1.64	.59	.384	(.060)
Agriculture	49	106.73	53.68	1.57	.71	.363	(.100)
Engineering	120	141.83	58.52	1.08	.84	.838	(.031)
Music	122	132.62	62.10	2.45	.91	.117	(.052)
TOTAL SUBJECTS (Continuing)	427	136.74	56.00	1.31	.69	.530	(.026)

TABLE XII

PROFESSIONAL SUBJECTS

FROM

PREVIOUS STUDIES

PROFESSIONS	REPORTER	REF.	YEAR	SCHOOL	CORRELATION	ALL OR L. ARTS
Agriculture	Bridges,J.W.	13	1920	Ohio State	.54, .39	.27,.35
	Henmon,V.A.	120	1930	Wisconsin	.60	.58,.52
	Jordan,AM	63	1920	Arkansas	.518	.415
Engineering	Bridges,J.W.	13	1920	Ohio State	.22,.25	.27,.35
	Cleeton,G.U.	19	1924	Carnegie	.442, .443	-
	Henmon,V.A.	120	1930	Wisconsin	.51	.58,.52
	Jordan, A.M.	63	1920	Arkansas	.507	.415
Education	Bridges,J.W.	13	1920	Ohio State	.52	.27,.35
	Jordan, A. M.	66	1920	Arkansas	.649	.415
	-	120	1920	Florida	.646	.609
School Chemistry	Ernst,J.L.	38	1923	Pittsburgh	.53,.73	.33,.11
School Economics	Ernst,J.L.	38	1923	Pittsburgh	.40,.38	.33,.11
Home Economics	-	120	1930	Florida	.513	,609
Pharmacy	Jones,E.S.	121	1931	Buffalo	.28,.28, .26,.26	.34,.26, .23,.37,.51
Nursing	Rhinehart,J.B	89	1933	Rd.Is.Hosp	.74	-
Applied Science	Symonds,P.M.	105	1924	Hawaii	.26,.28	.45,.42

subject, Latin is .89 sigma above the mean; Art .74 above the mean; and Religion .62 above the mean. Subjects below .8 of a sigma below the normal mean are Italian, Agriculture, and Botany. Spanish, Home Economics, Education, and Geography are between .1 and .2 sigma below the mean. The three lowest subjects are Italian .83 sigma, Agriculture .54 sigma, and Botany .89 sigma, respectively, below the mean. There does not seem to be much constancy in the nature of the subject bringing high or low selection except, in a very general way it seems as though cultural or abstract subjects and those that are usually considered as being hard are chosen by the more intelligent, and practical subjects and those usually considered to be easy by the less intelligent. We find a foreign langauge at both the top and bottom of our list; but the top one is a classical language and the bottom one a modern language. We find Art second from the top; but Music slightly below the mean. A possible explanation is that Music is a practical as well as a cultural subject, for many of the students of the Music School are planning to be teachers of music. We find Philosophy and Religion both near the top, testifying to the attraction of the abstract for the more intelligent. Astronomy is considered hard among the students; so are Latin and German. Some of

the social sciences are above the mean; some below. Some of the physical sciences are above the mean; some below. Subjects taken by almost all students because of formal requirements, like English and Mathematics are, of course, close to the mean. The distributionsof intelligence scores vary greatly but we can attach little significance to the variation owing to the wide variations also in number of cases.

Studying the grade ratios, now, the normal or continuing score is 1.31. We find the following subjects above the normal mean, in order from the highest down:- Astronomy, Music, Religion, Philosophy, Italian, Physical Education, Latin, Speech, Art, Education, French, Agriculture, Greek, Government, Zoology, Home Economics, Psychology, Chemistry, History, and Sociology. We find the following subjects below the normal mean, in order from lowest up:- Geology, Spanish, Physics, Engineering, Anthropology, Business Administration, Geography, Mathematics, Journalism, German, English, Economics, and Botany. Four subjects are more than the normal sigma above the normal grade mean:- Astronomy, Music, Philosophy and Italian. Four other subjects are between .5 and 1.0 sigma of the mean:- Physical Education, Latin, Speech, and Art. No subject is below 1.0 sigma below the mean, and only one, Geology, .5 sigma below the mean. Five subjects are between .3 and .5 sigma below the mean. They

are Spanish, Physics, Engineering, Anthropology, and Business Administration.

It might seem that subjects whose grade mean is below the normal mean are leniently marked subjects and those above severely marked. This is not entirely true, for subjects selected by the more intelligent should also show a higher grade ratio mean, and vice versa. However, if we classify our means of intelligence and those of grade ratios, we should find that those subjects whose grade means are of a lower class than their intelligence means are subjects which are severely marked. On the other hand, those subjects whose grade means are of a higher class than their intelligence means are leniently marked subjects. We divide the subjects into five divisions of intelligence and into five divisions of grade ratio according to the following scheme. Those subjects between .1 sigma and plus .1 sigma show normal intelligence, between minus .1 sigma and minus .2 sigma low intelligence; below minus .2 sigma very low intelligence; between plus .1 sigma and plus .2 sigma high intelligence; and above plus .2 sigma very high intelligence. We divide our grade ratios in a similar fashion but using of necessity different dividing lines. Those subjects between minus .3 sigma and plus .5 sigma show normal grade ratios; between minus .3 sigma and minus five sigma low grade ratios; below .5 sigma very low grade ratios; between plus .5 and plus 1.0 sigma very high grade ratios. We obtain from this the following results:-

SUBJECTS	CLASS INT.MN*	CLASS GRADE MN.	FALL IN CLASS	RISE IN CLASS
Latin	I	II	One	-
Art	I	II	One	-
Religion	I	I	-	-
Philosophy	I	I	-	-
Astronomy	I	I	-	-
German	I	III	Two	-
Anthropology	I	IV	Three	-
Government	I	III	Two	-
Sociology	I	III	Two	-
French	II	III	One	-
Engineering	III	IV	One	-
Mathematics	III	III	-	-
Chemistry	III	III	-	-
Business Adm.	III	IV	One	-
Physics	III	IV	One	-
Psychology	III	III	-	-
Physical Ed.	III	II	-	One
English	III	III	-	-
Economics	III	III	-	-
History	III	III	-	-
Speech	III	II	-	One
Greek	III	III	-	-
Zoology	III	III	-	-
Music	III	I	-	Two
Journalism	III	III	-	-

*I is Very High; II is High; III is Normal; IV is Low; V is Very Low

SUBJECTS	CLASS INT.MN	CLASS GRADE MN.	FALL IN CLASS	RISE IN CLASS
Geology	III	V	Two	-
Geography	IV	III	-	One
Education	IV	III	-	One
Home Ec.	IV	III	-	One
Spanish	IV	IV	-	-
Botany	V	III	-	Two
Agriculture	V	III	-	Two
Italian	V	I	-	Four

This indicates probably certain aspects of unstandardized marking (Chapter V Conc. vi and vii). The following subjects fall one class and are, therefore, probably marked a little too low: Latin, Art, Engineering, Business Administration, and Physics. The following subjects fall two classes and are, therefore, probably marked very much too low: Geology, German, Government, and Sociology. One subject, Anthropology, falls three places showing probably complete lack of worth in the marking system.

On the other hand Physical Education, Speech, Geography, and Home Economics rise one class showing probably easy marking; Music Education, Botany, and Agriculture rise two classes showing, probably very much too easy marking. Italian, rising four classes, was probably a gift to the two students who took it.

Nothing seems to be gained from a study of the grade ratio distributions except that they show very great variability.

The number of cases has, of course, much bearing on the

worth of the resulting correlation between intelligence and grade ratios. In Table VIII we have assembled those correlations of the complete list which are significant because they are over four times their own Probable Errors and at least .100 removed from the normal correlation. We find accordingly Art, Religion, Physics, Greek, and Botany above normal; Geology, Chemistry, Mathematics, Education, Physical Education, and Engineering below normal. It is interesting to note that Art and Physics probably marked too high, show abnormally high correlations, while Botany marked too low also shows an abnormally high correlation. On the other hand, Geology and Engineering marked too low, as well as Education and Physical Education marked too high, all showing abnormally low correlations. We suspect, therefore, that a poor marking system has the tendency to throw correlations off normal, though in no consistant direction. (Chapter V Concl vi)

There does not seem to be any consistant relationship between the size of the intelligence mean and that of the correlation. Art and Engineering, both well over the normal intelligence mean show on Table VIII the highest and the lowest correlations respectively.

In Table IX we included only such subjects showing at least 90 cases, and accordingly also relatively small Probable Errors in their correlations. Attention should be called to the English correlation of 583. It is especially significant as it is

the only single subject taken by all continuing students. The correlation is the only correlation, therefore, higher than the normal that shows a lower than normal Probable Error. The correlation for English is also more significant because, for most students, it involves more credit hours than does any other specific subject. In the course of their six semesters most students take at least eighteen credit hours of English. It may be that other subjects taken by as many students for as many credit hours would likewise approach close to the normal. The English correlation being above normal, indicates that the psychological examination is a better measure of ability in English than of total academic success. This is true even though the normal grade ratio is made on the basis of approximately 100 hours per student while in English it is made on the basis of 18 hours per student.

No consistant trends can be found in the previous studies. (Table X). Our correlations are, in all but the cases of Latin, Biology, Geology and Education, higher than the medians of the previous studies. The range of these medians is from .255 in Spanish to .66 in Education. Their master median is .408. Higher than .500 are only Education, Geology, Physics, and Biology. Previous results do not resemble ours; but cannot be strictly compared, for they involve different students, numbers and methods of computing.

Under the heading, "Professional Subjects" (Table XI) we grouped those subjects taken under special faculties of

of the University, other than the Faculties of the Liberal Arts College or the College of Pure and Applied Sciences. These grade ratios and their correlations are not to be confused with those under "intended occupations" in Chapter IV. Here we consider all students who elect those subjects even if they have no intention of making that field a life work. Also we consider here the grade ratios in the specific subject. There we consider the total grade ratio merely using the specific subject to locate our students. We find the correlations here, with the exception of Art, below the normal. Art is not as strictly a professional subject as it is taught at this University. It is taken more usually as a cultural study rather than a possible opening to the means of making a living. It differs from Music, in that most of the Music students are preparing either to teach music or sell their talents professionally after they are graduated. Moreover there are only eight cases of Art, making the correlation of little absolute significance. The fact that seven out of eight of these professional subjects show correlations below the normal leads us to look around for a reason. We suggest here the element of seriousness. Those who take professional courses are likely to have great variation in the attitudes toward those courses. Some of the students elect professional courses with an ambition that they will be able to use them soon to support themselves or their families. Others elect them as they might also select

any other course in the curriculum, as easily accessible, seemingly not too uninteresting, and not beyond their capacities. This variation in seriousness adds a factor other than intelligence in the procuring of academic success. The correlations between intelligence and academic success, in all professional subjects but Art, accordingly fall below the .50 mark.

In these subjects intelligence no longer accounts for over 50% of the factors making for school grades. (See Chapter I Part C).

There are only four professional subjects calculated on the basis of ninety cases or over; Business Administration, Education, Engineering and Music. The highest of the four is below the normal correlation. Music's small correlation is due mostly to a music survey course taken by students not taking music professionally, marked unduly easy, and yet necessarily considered, in general, with the more serious music courses. The next to lowest of all ninety and over case correlations is found in Engineering. Education is but slightly better. Possibly a strict grading system in Engineering and an easy one in Education have something to do with it. (See above). It is possible, too, that the element of seriousness may be more variable in Engineering than in Education.

A study of the means of intelligence of those taking these professional subjects shows that Agriculture is elected

by an unusually below average group. Art on the other hand is taken by an unusually above average group. The only other professional group above average in intelligence is the Engineering group. Engineering has the reputation of being a stiff course, and possibly, for that reason, tends to attract only the more intelligent who think themselves more capable of meetings its rigid requirements. The mean of intelligence of those taking Education is as much below the average as Engineering is above. This may prove the converse of what is true of Engineering. Education courses are supposed to be quite easy. Attention is called again to the comparison of intelligence and grade ratio classes showing that this reputation is not entirely unwarranted.

Previous studies (TABLE XIV) show correlations between intelligence and grades in professional subjects to be much higher than those between intelligence and grades in all subjects or academic subjects. This is the reverse of what we found. This apparent contradiction must be discounted, however, by the fact that the comparisons in previous studies are between two different groups of students, the professional students' grades being not only in professional subjects but also in others. In our study, on the other hand, the comparison is between two kinds of subjects, taken by the same group of students. The lower correlations in Engineering than in other professional subjects is as marked in these previous studies as in ours.

D - GROUPS OF SUBJECTS

We group together (TABLE XIII) certain of the subjects which are similar in content, emphasis, and technique of teaching. We use here the type of grouping that has become more or less common in colleges. Under the general heading "Foreign Languages" we include all languages in the curriculum of Louisiana State University, except, of course, English. Under the general heading "Social Sciences" we include Anthropology, Economics, Geography, Government, History, and Sociology. We also include a survey course in the Social Sciences given in the Lower Division, as naturally part of this classification. Under the general heading "Natural Sciences" we include Botany, Chemistry, Geology, Physics and Zoology. Psychology being an in between subject, belonging alike to both of these latter classifications, we omit it from any grouping. "Academic Subjects" includes all the subjects that are not classified in the preceding section as specifically professional subjects. There is certainly a correlational advantage in these groupings over the use of individual subjects, for the number of cases is much higher, the Probable Errors much smaller.

TABLE XIII

A. C. E. P. E. AND GRADE SCORES

BY

SUBJECT GROUPS

SUBJECT GROUP	NO. CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN SCORE	SIGMA SCORE	CORRELATION	P. E.
SOCIAL SCIENCES							
Anthropology, Economics, Geography, Government, History, and Sociology, Survey Course	435	137.01	56.16	1.42	.88	.541	(.023)
NATURAL SCIENCES							
Astronomy, Botany, Chemistry, Geology, Physics, & Zoology	380	136.55	56.46	1.25	.94	.528	(.025)
FOREIGN LANGUAGES							
French, German, Greek, Italian, Latin, Spanish	265	144.70	57.20	1.39	1.17	.451	(.033)
ALL ACADEMIC SUBJECTS	427	136.74	55.82	1.26	.77	.527	(.025)
TOTAL SUBJECTS							
Continuing	427	136.74	56.00	1.31	.69	.530	(.026)

Also more credit hours are included in each case. This averages out extreme scores, normalizing the frequency curves of both variables and making the resulting correlations more reliable. (See above). The result in each case is a correlation very close to the normal correlation, obtained from all scores from all continuing students. This was .530. It will be remembered here that the correlation with English was .583, and we considered this very significant because of the very small Probable Error. In the Social Sciences we obtain a correlation of .541; in the Natural Sciences, .528; in Academic Subjects .527. The correlation with Foreign Languages is somewhat lower, .451. This illustrates the point made about the number of cases and number of extreme grades involved. Here there are only a little more than half the students who elect Foreign Languages. Among them are several cases containing but three or six credit hours. This results in extremely low or high ratios, which tends to unnormalize the correlation. Yet even the Foreign Language correlation of .451 is close to the normal .530. The Social Science group correlation is higher than that of any one of the six included Social Sciences. The Natural Science group correlation is higher than those of all but two of the included Natural Sciences. Physics and Botany are the exceptions. The Foreign Language group correlation is higher than in two specific languages and lower than in four others but closer to the normal

correlation than any specific language.

There does not seem to be any comparative bearing on the correlations either from the means or distributions of intelligence or grades. The intelligence means and distributions of each group of subjects is close to normal, except, in the case of the foreign language group. The distributions are a little higher and wider. There is some variation in the means and distributions of the grades; but this does not seem to have any significance. It seems to follow, however, that the narrower the distribution of grade scores in these groupings, the higher the correlation between intelligence and grades. This would probably again bear out the point that averaging out the extreme scores, as we do when we increase the credit hours, normalizes the correlation.

Our Foreign Language Group result (Table XIV) is considerably higher than the median of .38 in the five previous studies of the same thing. There is only one other group study that we have found, that by Jordan in Physical Science. It is not strictly comparable with ours because our Natural Science grouping includes also the Biological Sciences.

TABLE XIV

GROUPS OF SUBJECTS FROM PREVIOUS STUDIES

GROUP	REPORTER	REF.	YEAR	CORRELATION	MEDIAN
Foreign Languages	Jordan, A.M.	63	1920	.313	
	Odum, C. L.	121	1931	.38	
	Segel, D	97	1931	.42	
	Stone, C. L.	102	1932	.31	
	Thurst. & Thurst.	121	1931	.38	.38
Physical Sciences	Jordan, A.M.	97	1920	.448	.448

CHAPTER III

PARTS OF THE

AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION

CHAPTER III

As explained in Chapter I Part B, the American Council Psychological Examination is composed of five parts. Each of these is presumed to be testing some special factor of intelligence. We propose first to find the relationship between each of these five parts and the whole of the test. Secondly we shall compare correlations between these parts and grade ratios with similar correlations between the whole examination and the same grade ratios.

A- PART AND WHOLE

Table XV shows that though these separate tests do not test exactly the same thing as the sum of all five, the correlations between the parts and the whole are sufficiently high to indicate a definite and very large common component. Since these tests are purposely made very different from one another, especially the verbal from the two non-verbal ones, the existence of this intercorrelation is significant. We might call this common factor general intelligence. (See Chapter V Concl. XII). These correlations, ranging from .627 to .811, are similar to those obtained between different examinations. (Pintner 83 p.111). The Arithmetic Test is, by far, the least important in the total examination score, for they correlate only .627. The Opposite Test is the most important, for it correlates 811. The means and sigmas of the parts vary greatly.

TABLE XV

PARTS OF A. C. E. P. E.

AND TOTAL A. C. E. P. E.

(NUMBER OF CASES - 427)

PARTS OF A.C.E.P.E.		MEAN	SIGMA	CORRELATION	P. E.
I.	Arithmetic	28.79	13.00	.627	(.019)
II.	Opposites	31.20	18.30	.811	(.007)
III.	Completion	27.93	11.44	.754	(.014)
IV.	Artificial Language	27.48	18.36	.691	(.017)
V.	Analogies	24.25	14.07	.752	(.014)

B - PARTS AND SUBJECTS

Far more important than comparing the parts with the whole is comparing the correlation between the parts and special subjects and subject groupings. We have chosen the three subject groupings we used in Chapter II, the Social Sciences, the Natural Sciences, and the Foreign Languages. Together with these we have chosen, for this purpose, English and Mathematics. The large number of cases, the small Probable Errors, and the averaging out of extreme scores by large number of credit hours in all these cases, make this selection of worth.*

Tables XVI and XVII should be considered together. The latter is an analysis of some of the facts of the former. The Analogies Test, though the very worst of all five tests for Prognosis in the Languages and the Social Sciences, is the best of all for Mathematics. In this one subject it is even better than the whole examination. The Arithmetic Test, on the other hand, while better for Mathematics than for any of the three groups or English, is decidedly a worse predicter of Mathematical ability than the total test. The conclusion seems to be inevitable, therefore, that concepts of proportion which are fundamental to the Analogies Test, are far more important in higher Mathematics than are numbers and the elementary arithmetic processes. The Analogies Test could well stand by itself as a prognosticator of mathematical success. An interesting supplementary study might combine the Arithmetic Test

*English was taken by all continuing students; Mathematics and the three groups by most of them.

TABLE XVI

PARTS OF A. C. E. P. E. AND SPECIAL SCORES

A.C.E.P.E. PARTS	ENGLISH		FOREIGN LANGUAGES		MATHEMATICS		NATURAL SCIENCES		SOCIAL SCIENCES		TOTAL SCORES	
NO. OF CASES	427		285		276		380		425		427	
	r.	P.E.	r.	P. E.	r.	P.E.	r.	P.E.	r.	P.E.	r.	P.E.
I.Arithmetic	.554	(.030)	.266	(.038)	.381	(.034)	.376	(.029)	.372	(.028)	.349	(.029)
II.Opposites	.442	(.027)	.297	(.038)	.189	(.026)	.359	(.030)	.450	(.027)	.460	(.025)
III.Completion	.496	(.024)	.358	(.036)	.149	(.040)	.337	(.031)	.444	(.026)	.395	(.027)
IV.Artificial Language	.562	(.022)	.369	(.035)	.238	(.038)	.419	(.028)	.384	(.027)	.450	(.026)
V.Analogies	.381	(.027)	.164	(.040)	.440	(.033)	.344	(.030)	.335	(.027)	.395	(.027)
TOTAL A. C. E. P. E.	.585	(.021)	.451	(.033)	.397	(.034)	.528	(.025)	.541	(.023)	.550	(.026)

TABLE XVII

BETTER CORRELATIONS

FROM PART THAN FROM WHOLE

PART	SUBJECT	CORRELATION	P. E.	WHOLE r.	WHOLE P. E.
V. Analogies	Mathematics	.440	(.033)	.397	(.034)

(All other correlations better with whole)

POOR CORRELATIONS

(Less than .300)

PART	SUBJECT	CORRELATION	P. E.
I, Arithmetic	English	.284	(.030)
I. Arithmetic	Foreign Languages	.266	(.038)
II. Opposites	Foreign Languages	.297	(.038)
II. Opposites	Mathematics	.189	(.026)
III. Completion	Mathematics	.149	(.040)
IV. Artificial Language	Mathematics	.258	(.036)
V. Analogies	Foreign Languages	.164	(.040)

with the Analogies Test and correlate the two with grades.

In all other cases except the Analgbes Test for Mathematics, the total examination is more predictive of success, than any one of its five parts. Some parts are better than others, however, The Artificial Language is the best of all five for discovering ability in English, in the Foreign Languages, and in the Natural Sciences. The reason for this is clear in the case of Foreign Languages, for grammatical insight and word formation are the essentials of both the test and the criterion. This is also true, to a lesser extent of the test and English. It is not clear why it should likewise apply to the test and the Natural Sciences. It may be that ease in using the jargon of the sciences may have a great deal to do with success in studying them. If this is true, science could be understood by more people by merely simplifying its vocabularies and its idioms. The Completion Test is the best of the five for predicting ability in the Social Sciences, the worst, however, in the Natural Sciences. The ability to assimilate easily a host of general information indicated by this test is needed for proficiency in the Social Sciences. The Natural Sciences, instead, require the ability to master specific facts rather than general information. The Opposites Test is the best of the five parts for predicting total grades, the worst for predicting ability in Mathematics. Primarily a vocabulary test, it naturally shows a tendency to favor sub-

jects which are mostly verbal. The Arithmetic Test, not the best for any subject, including Mathematics itself, is the worst of all the tests for both English and the total scores. This is probably the converse of the reason given in connection with the Opposite Test. The Arithmetic Test is primarily non-verbal.

The correlations obtained on our chart suggest that better results, than any here obtained, might be had by combination of the Opposites, Completion and Artificial Language Tests for prognosis in English, the Social Sciences, and total subjects;(2)a combination of the Analogies Test and the Arithmetic Test for prognosis in Mathematics; and (3) a combination of the Artificial Language and the Arithmetic Test, or these two and the Analogies Test for prognosis in the Natural Sciences.

The results of previous studies of the parts of the examination (Table XVIII) are heterogeneous and confusing.*

The Arithmetic Test tests English, in these previous studies , with a median of .281; Foreign Languages, .259; Mathematics, .380; and all subjects .258. The Opposites Test tests English with a median of .423; Foreign Languages, .340; Mathematics, .355; and all subjects .329. The Completion Test tests English with a median of .424; Foreign Languages .190; Mathematics .330; and all subjects .348. The Artificial Language Test tests English with a median of .540; Foreign Languages .380; Mathe-

*To these studies might be added the work of McGrath and Froman (72) which considers only the correlation between the opposites test and the whole examination, .78; and the work of Mosier (76) which studie d the parts in reference to specific curricula such as the Law curriculum, Engineering, etc.

TABLE XVIII

PARTS OF A. C. E. P. E. AND SUBJECT SCORES

PREVIOUS STUDIES

A.C.E.P.E.PARTS	REPORTER	REF.	ENGLISH	FOREIGN LANGUAGES	MATHEMATICS	ALL SUBJECTS
I. Arithmetic	Brown, R. A.	121				.258,.210 .237
	Davis, F.G.	117			.37	
	Fryer,D	117			.204	
	Gerberich,J	43	.281	.378	.616	
	Moyse,J.	77	.285		.399	.446
	Segel,D & Gerberich,J	98	.20	.14	.38	
	Thurst.LL.& Thurst,G.T.	120				.312,.325 .340
	Toll, C.H.	129				.25, .16
II.Opposites	Brown,R.A.	121				.329,.261,.300
	Davis,F.G.	117	.261			
	Fryer,D.	117	.355			
	Gerberich,J	43	.517	.616	.350	
	Moyse, J.	77				.389
	Segel, D. & Gerberich,J	98	.51	.32	.36	
	Thurst,LL.& Thurst,G.T.	120				.423,.408,.468
	Toll, C.H.	129				.27, .19
	Wagnep,ME & Stpabele	133 134	.49	.34		
	Wilson Co.	60	.654			
III.Completion	Brown,R.A.	121				.325,.268,.314
	Davis, F.G.	117	.473			
	Fryer,D.	117	.321			

TABLE XVIII - Continued

A.C.E.P.E.Parts	REPORTER	REF.	ENGLISH	FOREIGN LANGUAGES	MATHEMATICS	ALL SUBJECTS
III Completion-Continued	Gerberich,J	43	.438	.550	.307	
	Seleg,D. & Gerberich,J	98	.41	.10	.33	
	Moyse,J	77	.519		.392	.500
	Thurst.LL.& Thurst.G.T	120				.348,.369,.445
	Wagner,ME.& Strabel,E.	133 134	.57	.18		
IV. Artificial Language	Brown,R.A.	121				.320,.285,.320
	Davis, F.G.	117		.48		
	Fryer,D.	117		.187		
	Gerberich,J.	43	.654	.748	.380	
	Segel,D. & Gerberich,J	98	.54	.38	.43	
	Moyse,J.	77				.305
	Thurst,LL.& Thurst,G.T.	120				.256,.420,.417
	Toll,C.H.	129				.320,.285,.320
	Wagner,ME& Strabele,E.	133 134	.30	.39		
V.Analogies	Brown,R.A.	121				.248,.187,.211
	Gerberich,J	43	.380	.436	.472	
	Seleg,D.& Gerberich,J	98	.38	.25	.31	
	Moyse,J	77				.590
	Thurst,LL & Thurst,G.T.	120				.169,.324,.323
	Wagner,M.E.& Strabel,E.	133	.18			

matics .405; and all subjects .320. The Analogies Test tests English with a median of .380, Foreign Languages, .343; Mathematics .391, and all subjects .248. These medians are very close to our own. The best test of English is the Artificial Language Test, with the Opposites and the Completion also high which is in agreement with our results. The best test for foreign languages is the Artificial Language Test. The Opposites Test is also high and so is the Analogies Test. In our study, though the Artificial Language Test also has first place, the Completion Test came second and the Analogies Test was low. The best test for Mathematics in these previous studies is the Artificial Language Test; Analogies comes second and Arithmetic third. In our study the Artificial Language Test was comparatively low. There is an agreement, however, in the fact that the verbal tests better predict success in all subjects than the Arithmetic and Analogies Tests. These previous studies are also suggestive of combinations. We could find no previous study that carried out these implications, and tried the value for prognosis, of combining, partialling out, and weighting the respective parts in order to obtain higher correlations. A large field of research is, therefore, still to be explored. (Chapter V Concl.xiii)

CHAPTER IV

PERSONAL FACTORS

CHAPTER IV

PERSONAL FACTORS

In this Chapter we segregate the students into more homogeneous groups* Where the records do not indicate the personal factor considered, the case is omitted. This results in a sampling rather than a study of all the students. The sampling, however, does take into consideration most of the continuing students and is, for our purposes, random.

A- AGE

Of our 815 cases, 797 clearly give their age at registration in years and months. We have divided our group into five convenient classes, those fifteen, those sixteen, those seventeen, those between eighteen and twenty, and those twenty-one or over. Seventeen to twenty is the usual age of entrance into a Southern University where the lower school course is usually eleven years. About half of these are seventeen and half between eighteen and twenty. Students of fifteen and sixteen have either started their schooling before the age of six, or have skipped grades, or both. They are the accelerated group. They, too, can well be divided into two subgroups, The sixteen year olds are but slightly accelerated. This may have resulted entirely from such a circumstance as having attended a private first-year school at the age of five. It may or may not be due to superior ability. The fifteen year olds, on the other hand, undoubtedly must have displayed some talents which helped

*Suggestion from Wagner and Strabel (132) who did this in connection with finding the prognosis value of Regents Examinations and the Iowa Content Examination.

them through the lower schools more rapidly than the normal stride. We find also one fourteen year old student. We include her in our table among the fifteen year olds.*1 In the fifth division we group together all those over twenty-one feeling that therein we had a special group, probably all of whom had been away from school for a time and because of some burning ambition had returned again.

Converting the numbers of our table (Table XIX) into percentages, we find that, of the total group considered, 2% were fifteen, 18% sixteen, 34% seventeen, 41% eighteen to twenty, and 5% twenty-one or over. Of those who were fifteen 56% dropped out, of those sixteen 37%, of those seventeen, 40%, of those eighteen to twenty 56%, of those twenty-one or over 49%. We are not able to read any elimination tendencies from these percentages.

The mean of intelligence of the fifteen year old group is the highest. This is a decline as the age level increased.*2 There is one exception. Those who are elimineted over twenty-one years of age are brighter than any other eliminated group with the exception of the fifteen year olds. Further in this group the brighter ones are eliminated; the duller continue. A probable explanation of this is that brighter older students more easily recognize the difficulty of competing with younger and more pliable student.

*1-Her place is indicated by parenthesis. She was above the average in intelligence. She did not continue. The records do not say why.
*2-This is in accord with previous studies by Terman(109 pp491,492)and Brigham (83 p.307) and Whinery (83 p.307).

TABLE XIX

AGE AND A. C. E. P. E.

A. C. E. P. E. SCORES

	0-19	20-39	40-59	60-79	80-99	100-119	120-139	140-159	160-179	180-199	200-219	220-239	240-259	260-279	280-299	300-319	NO.	MN.
Eliminated 15 (≤15-)	0	0	0	0	3	1	1	1	0	(1)	1	0	0	0	1	0	9	150.00
Continuing 15	0	0	0	0	0	1	1	0	1	1	0	0	1	0	1	1	7	207.14
Eliminated 16	1	0	3	5	5	7	9	4	8	4	5	1	1	1	0	0	54	137.41
Continuing 16	0	0	0	3	6	14	13	8	16	9	12	4	4	0	0	1	90	159.56
Eliminated 17	1	2	7	13	17	17	18	10	8	6	4	3	1	1	0	0	108	121.48
Continuing 17	0	0	7	8	22	21	25	24	18	12	9	4	7	2	0	1	160	142.50
Eliminated 18-20	0	4	20	30	36	29	19	13	14	6	5	3	1	1	0	2	183	111.86
Continuing 18-20	0	3	14	21	21	24	18	14	13	4	4	6	2	1	0	0	145	118.65
Eliminated 21-21/	0	1	1	4	2	2	0	3	0	1	3	1	0	1	0	1	20	142.00
Continuing 21-21/	0	2	5	2	1	3	1	2	2	2	0	1	0	0	0	0	21	107.41

TOTAL MEAN - 129.95
TOTAL NUMBERS - 815

The same thing is shown by the correlation between intelligence and age, (Table XX) which is decidedly negative, -.314. Previous studies are substantiated by this result.*

We consider now the correlations between school grades and intelligence at the different age levels. At fifteen there is the highest correlation, .702. At sixteen it sinks slightly below the normal. At seventeen it rises again above normal. At eighteen to twenty it is much below normal. At above twenty-one it is very small, considering the comparatively large Probable Error, even insignificant. Excepting the sixteen year group, there is a drop with the advance of age. We would again suggest that this is due to the increase of the variable of seriousness or ambition at later ages which tends to lower the correlation between intelligence and grade ratios. (Chapter V Consl.xi).

There may also be a loss of homogeneity, as the age rises. Fifteen year olds may be of a bookbish type to achieve so much acceleration. The interruption of this trend among the sixteen year old group may be due to the fact that many of them arrived at University early, not alone because of their ability to climb rapidly but because of starting early. This may also result in a great variation in "seriousness" for some of these students may put out a great deal of extra effort to maintain their early advantage. Seriousness decreases our correlations. (Chapter V Consl.xi). The correlation, therefore, of the sixteen year group

*Terman shows a correlation of -.318 (109 p. 491); Brighton of -.28 (83 p. 307) Patterson shows that those who have a median I.Q of 115, have a median age of 18. Those having a median I.Q of .86 have a median age of 19. (80)

TABLE XX

A. C. E. P. E. AND AGE

MEAN AGE = 18.00

SIGMA AGE DISTRIBUTION = 1.39

NUMBER OF CASES = 425

CORRELATION AGE AND A. C. E. P. E. = -- .314

P. E. = (.029)

A. C. E. P. E. AND TOTAL GRADE SCORES

(AT EACH AGE GROUPING)

AGE	NO. CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN SCORE	SIGMA SCORE	CORRE-LATION	P. E.
15	7	207.14	72.12	2.03	.69	.702	(.129)
16	90	159.56	48.90	1.48	.74	.461	(.054)
17	160	142.50	52.64	1.42	.30	.580	(.034)
18) 19) 20)	145	118.65	51.56	1.10	.61	.391	(.047)
21+	21	107.14	65.28	1.41	.55	.189	(.141)
All Ages	427	136.74	56.00	1.31	.69	.530	(.026)

is lower than that of the seventeen year olds; but still higher than the two following groups. It should be noticed again how the means of intelligence descend with age. The distributions of intelligence are wider in the extreme classes than in the center. Students reaching university at an average age do not vary as much from each other in intelligence as students either quite young or quite old. The grade scores show a descent comparable to the descent of intelligence with age; but among the oldest group they pick up again. This may be due to their seriousness increasing their scores, or it may be due to their professors being impressed with their maturityand giving them higher marks than they really deserve.* This latter is known as the "halo effect".

* Constance (23)

B - SEX

Are sex differences additional factors to intelligence, in determining university success? Do they affect the relationship of intelligence to grades?

In our group of students (Table XXI) there are 547 boys and 267 girls. The boys outnumber the girls by over two to one. Of the boys, 48% were eliminated and of the girls 47%. There is then no significant sex difference so far as elimination is concerned. The girls who continue, however, have a higher mean intelligence than the boys who continue. On the other hand, the girls who are eliminated have a lower intelligence mean than the boys who are eliminated. Possibly this inverse ratio is due to the fact that boys may be eliminated for more reasons that have nothing to do with intelligence than girls; particularly they may be called upon to help support the family. Considering both the eliminated and the continuing together, the girls are more intelligent than the boys*. (Chapter V Concl ii). The apparent feminine intellectual superiority may be due to selection, for though the number of boys and of girls in the general population are about equal, only half as many girls as boys come to this University. We may be witnessing this selection still taking place, since the boys eliminated are more intelligent than the girls eliminated. The larger elimination has, of course, taken place before University. Both boys and girls who continue have higher psychological means than those who do not. (Chapter V, Concl.v)

*Previous Studies are not consistant in this finding. See Pintner 83 p. 496,7]

TABLE XXI

SEX AND A. C. E. P. E.

A. C. E. P. E. SCORES

	0-19	20-39	40-59	60-79	80-99	100-119	120-139	140-159	160-179	180-199	200-219	220-239	240-259	260-279	280-299	300-319	NO.	MN.
Boys Eliminated-	1	5	21	38	42	21	30	25	21	13	8	8	2	3	1	3	262	121.00
Girls Eliminated-	1	2	12	16	23	17	20	9	9	4	11	0	1	1	0	0	126	117.46
Total Eliminated	2	7	33	54	65	38	50	34	30	17	19	8	3	4	1	3	388	119.84
Boys Continuing	0	6	22	25	38	38	41	32	35	19	9	12	5	2	1	2	285	130.42
Girls Continuing	0	0	5	9	12	26	17	17	15	8	16	3	11	1	0	1	141	149.15
Total Continuing	0	6	27	34	50	64	58	49	50	27	25	15	14	3	1	3	426	136.62

There are great sex differences in the correlations between intelligence and grades (Table XXII). The girls almost double the boys; .624 against .367. Again we may try to explain this in the two ways found valuable throughout the rest of this study. It is likely that the girls' high correlation is due somewhat to the factor of homogeneity. Girls are brought up more nearly alike, with similar childhood interests and most often ambitions to homemaking and motherhood. The boys on the other hand, when still very young, are more varied in the nature of their games, their ambitions, their interests. A more homogeneous group shows a higher correlation between intelligence and grade scores. (Chapter V Concl.ix).

On the other hand the variability of seriousness may enter in more strongly since the attention of the boys is usually more directed to the eventual earning of a living. Seriousness decreases the correlations (Chapter V. Concl. xi).

Though there is marked variation in the intelligence means, their sigmas are about the same. The girls and boys alike show approximately the same distribution. The girls' scores are somewhat higher than the boys' but not as much as would be expected from their superior intelligence.* The sigmas of their respective scores are approximately the same, the girls just a slight bit larger.

* Book found this just opposite. The boys were more intelligent than the girls but the girls were higher in their work (11 p.377) and were promoted more rapidly (11 p.85). This was, however, below the University.

TABLE XXII

A. C. E. P. E. AND GRADE SCORES

BY

SEXES

	NO CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN SCORE	SIGMA SCORE	CORRE-LATION	P. E.
Boys	286	150.42	54.76	1.22	.67	.567	(.034)
Girls	141	149.15	56.18	1.51	.72	.624	(.034)
TOTAL Continuing-	427	136.74	56.00	1.31	.69	.530	(.026)

Of the six previous studies (Table XXIII) of sex difference in these correlations four show the same feminine advantage as ours. The fifth has three separate parts; and, of the three, two agree. The sixth is reversed but slightly. Of the twelve parts included in these six studies all, but two, agree that the correlation for women is better than for men.

TABLE XXIII

SEX AND INTELLIGENCE

FROM

PREVIOUS STUDIES

COLLEGE	REF.	r. MEN	r.WOMEN
Alma	62	.374	.497
Carleton	65	.50	.58
Macalester	40	.333	.563
		.289	.525
		.394	.325
		.183	.439
Michigan	63	.457	.560
		.371	.390
		.419	.485
Oregon	62	.440	.345
		.466	.484
Oregon	61	.67	.64

C - HOME-TOWNS

Certainly home-towns would be expected to have some decided effects upon the relation of intelligence to collegiate success. Do students from the South differ in this respect, from those from the North? Do students in a University close to home have an advantage over students coming a long distance? Do students from a large city have advantage over those from a small one? The home-town should show certain definite characteristics of attitudes in life, previous preparation, breadth or narrowness of viewpoint. Do these, if they exist, affect our correlations? (Table XXIV) There are no pertinent previous studies.*

Of the 635 cases reporting home-town 348 were eliminated; 287 continued. The great difference in these figures between the total continuing and the total eliminated is due to the fact that we had to obtain the home-towns, in the latter case, from the Lower Division records; while in the former case we could use both the records of the Lower Division and the Registrar. The home-town was not directly reported on the Lower Division records. We were forced to judge the home-town from the high school.

In the continuing group we found great inconsistencies between high schools and home-towns. For that reason, for the

* A few studies at High School level show: (1) that Southern pupils have lower scores in Army Alpha than Northern students (Alexander);(2) that city children are more intelligent than rural children(Bookll;p.26); Pressey and Thomas 87); Freeman 41p.457 and (3) that foreigners, specifically Italians, are less intelligent than natives (Murdoch 78)

TABLE XXIV

HOME TOWNS

A. C. E. P. E. SCORES

A. Eliminated From	0-19	20-39	40-59	60-79	80-99	100-119	120-139	140-159	160-179	180-199	200-219	220-239	240-259	260-279	280-299	300-319	NO.	MN.
States Out of South	0	0	2	3	2	3	1	6	0	3	0	0	1	2	0	3	26	151.54
Southern States Out of La.	0	1	2	5	8	5	4	1	4	2	2	3	0	0	0	0	37	124.05
New Orleans	0	1	3	3	5	4	5	2	6	1	2	0	0	0	0	0	31	123.55
Baton Rouge	1	1	2	6	9	15	6	4	1	2	4	1	1	2	0	0	55	125.64
Alexandria)) Shreveport) Monroe) Lake Charles)	0	1	1	3	4	2	3	4	1	1	2	1	1	0	1	0	25	136.40
Smaller Cities and Towns	1	4	21	31	34	22	23	12	13	6	5	2	0	0	0	0	174	105.98
B. Continuing From																		
States Out of South	0	0	1	0	4	2	3	1	4	0	2	2	0	0	0	0	19	131.79
Southern States Outside of La.	0	1	1	4	3	5	2	4	3	2	5	4	1	1	0	1	37	158.11
New Orleans	0	0	2	1	3	4	5	5	5	3	3	1	0	0	0	1	33	147.58
Baton Rouge	0	0	9	13	14	23	11	19	14	8	8	4	4	2	0	1	130	136.77
Shrv.-Alex.-Monr.-Lake Charles	0	2	1	8	1	6	6	5	1	2	2	0	1	0	1	0	36	123.89
Smaller Cts-Twns	0	3	14	4	24	22	25	25	15	13	5	4	8	0	0	0	152	132.5

TOTAL NUMBER - 815
TOTAL MEAN - 129.95

continuing group we found great inconsistencies between high schools and home-towns. For that reason, count only those who actually gave their home-town. This gives us, for the second group, a smaller but a far more accurate scoring. However, the two groups are at least roughly comparable. One thing more should be added here for accuracy. We count those who gave their home-town as Istrouma as coming from Baton Rouge. There was confusion, on the part of students, in answering this question. Often students, known to come from Istrouma, gave Baton Rouge as their home-town. Istrouma is a suburb of Baton Rouge adjacent to the great Standard Oil Plant which is considered outside the city for taxation purposes. There is, however, no clear cut division, outside of the political one, between the two corporations. As far as we know this type of situation does not affect any of the other Louisiana home-towns.

Of the 348 eliminated exactly half come from the smaller towns, cities and villages of Louisiana. Of those continuing a few more than half come from the smaller towns, cities and villages. There does not seem to be any material difference so far as elimination is concerned, therefore, as to those who come from the smaller places. Only sixty-three of those eliminated and fifty-six of those continuing come from outside of Louisiana, again no significant difference. A large proportion of the total number 185, or almost one-third, come from Baton Rouge, the seat of the University and of the Capitol and State

Government Offices. Only 29% of these were eliminated. Over 70% continued. This unusual advantage toward continuing is evidently due to the convenience and inexpensiveness of living at home. From the City of New Orleans 48% were eliminated and from the middle sized cities 41%, in both cases about a fifty-fifty ratio. This is the same as with the smaller places in Louisiana and the places outside of Louisiana. The slightly higher percentage of elimination from New Orleans may be due to the location of Tulane University, Newcomb College and Loyola University in that city which absorb some of those who leave Louisiana State University. Students from the middle sized cities have just a shade better chance of continuing than those from the smaller towns. This is probably purely accidental.

A study of the intelligence means shows that the intelligence of those eliminated from the Southern States, from New Orleans, from Baton Rouge, and from the smaller towns of Louisiana is lower than that of those continuing (Chapter V;Conclv.). The eliminated from outside the South, however, and the eliminated also from the middle sized cities of Louisiana, with the exception of Baton Rouge, show higher intelligence than the continuing students. With the former it may be due to the fact that many of the more intelligent students from afar, come South because of an experimental yearning for tasting other cultures, seeing new sights, a wanderlust as it were, that carries them away again just as it brought them here in the first place.*

*The students of lesser intelligence,on the other hand often come here because they cannot fill the requirements of schools closer home. This has been the experience of the author after numerous contacts with students from outside the South over a period of a decade in connection with this University.

The similar results from the middle sized Louisiana towns is a great deal more confusing. Maybe many of these come to Louisiana State University as to a Junior College and then continue on in Eastern or Middle-Western schools. No real solution to this can be had without a more definite study of what becomes of the eliminated. We know nothing about them except that they are no longer on the records we have used.

The correlations between intelligence and grades for the different groups of continuing Southern students, whether from within or without Louisiana (Table XXV) are all definitely high and positive. All, but those from the smaller places in Louisiana, display correlations higher than that of the students taken as a whole. This must be due to the more homogeneous grouping obtained by separating students according to home-town. Homogeneity always increases the correlation. (Chapter V. Yonclix). When background and previous education are, in this way, kept fairly constant, there is an increase of correlation. Baton Rouge shows the highest correlation, New Orleans second, outside the State but in the South third, the middle sized cities fourth, the small towns fifth, and outside the South last with a minus correlation. The high results for both New Orleans and Baton Rouge are due to the fact that they stand by themselves and are therefore quite homogeneous. The smaller places' correlation falls slightly below the normal. This is probably due to the heterogeneity of small places, particularly in Louisiana

TABLE XXV

A. C. E. P. E. AND GRADE SCORES

BY

HOME TOWNS

HOME-TOWN	NO. CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN SCORE	SIGMA SCORE	CORRELATION	P. E.
Out of South (In U. S. A.)	19	151.79	46.34	1.47	.60	-.064	(.160)
In South (Not La.)	37	158.11	66.84	1.47	.72	.576	(.074)
New Orleans (Metropolis)	35	147.58	53.70	1.34	.71	.619	(.073)
Baton Rouge (Capitol and University)	150	136.77	56.28	1.36	.76	.627	(.036)
Middle Size (Shreveport, Monroe, Alexandria, Lake Charles)	56	123.89	59.74	1.21	.63	.534	(.080)
Small Cities, Towns, and Villages in La.	152	132.50	53.96	1.23	.62	.473	(.042)
TOTAL Continuing	427	136.74	56.00	1.31	.69	.530	(.026)

where the small town populations in the North are distinctly unlike those in the South of the State, even in language and religion. The Southern part is predominantly French Catholic and many of the older people speak only French. This lack of homogeneity as to background and creed counteracts the increase of homogeneity that we gain by considering similar sized places. The correlation between intelligence and grade ratios for those nineteen students who come from outside the South, is surprisingly a minus one. It is the less intelligent of this group of students who do the better course work. They are probably less homogeneous than the Southern students, and the factor of seriousness is probably more variable with them. Either of these elements would partially explain the result. (Chapter V Concl. ix and xi). For some reason these out of the South students obtain much higher grades than their intelligence record justifies. Their intelligence mean is below the normal while their grade mean is much above. That may be because of their greater seriousness. It may be due also to the fact that they tend to impress their teachers more by their coming so far. Or it may be due to an expectation of their superior ability because they come from the North, which is not at all justified by their actual showings on the Psychological Examination.* Another possible explanation is that a few of them are on the Football Team. This will be considered in a later section. Why other Southern States should produce at Louisiana University a higher intelligence mean than Louisiana itself is

*Again the "halo effect".

another difficult question. Evidently the brighter students of these other states choose to leave home and come to Louisiana State University, rather than attend their own colleges. New Orleans shows the highest intelligence mean, and next to it comes Baton Rouge. The small rural towns, however, produce more intelligent students than the middle sized cities of Shreveport, Monroe, Alexandria, and Lake Charles.

With the exception of places out of the South, the scores show a fair consistency with the intelligence mean. Baton Rouge students score a little higher than New Orleans students in spite of a slightly lower intelligence. This is possibly due to their better adaptation to this University environment. Distributions of both scores and intelligence show no particular trends.

D - FATHERS' OCCUPATIONS

We recognize that one of the best ways of segregating our students into a homogeneous group is along the lines of their social status.*1. The use of such a device as the Sims Score Card for Socio-Economic Status would have greatly enlarged the scope of this work. The occupation of the father is a rather rough index of the same thing.*2. Students were asked to list their fathers' occupation. Some of them left the question blank. Others, whose fathers were dead or were not at the time living with the family, listed their mothers' occupations instead. Others instead of listing their fathers' occupations gave their fathers' firms names. This was true of children of Standard Oil and Railroad employees. In such cases we could not judge what work the fathers did, as such firms encompass a variety of different occupations. Even after eliminating those whose answers were not clear for any of the foregoing reasons, we found it difficult to classify those we had left. We were forced to arbitrary divisions to avoid having too few cases under any one rubric. In Table XXVI we use an eight fold division: (1) Doctors. (We include also dentists, optometrists, etc.), (2) Lawyers. (We include also judges). (3) Engineers. (We include also chemists). We exclude those who obviously belong under the classification of Labor but whose children glorify them with special engineering titles.) (4) Teachers. (We include the two ministers, and, of course, the few superintendents

*1-Pintner 83 pp 513-519
*2-Book 11 p.205; Freeman 41 pp 452-454; Pressey & Ralston 86; Terman 107 p. 63; Pintner 83 pp 516-517.

TABLE XXVI

FATHER'S OCCUPTAION

A. C. E. P. E. SCORES

E-Eliminated
C-Continuing
T-Total

		0-19	20-39	40-59	60-79	80-99	100-119	120-139	140-159	160-179	180-199	200-219	220-239	240-259	260-279	280-299	300-319	NO.	MN.
Doctor(Also Dentist,Opt)	E-0	0	2	4	4	3	2	2	2	2	1	0	0	0	0	0	22	116.36
	C-0	0	2	0	1	3	2	2	3	1	0	2	0	0	0	0	16	140.00
	T-0	0	4	4	5	6	4	4	5	3	1	2	0	0	0	0	38	127.37
Lawyer (Judge)	E-0	0	0	0	2	3	0	4	1	0	0	0	0	0	0	0	10	128.00
	C-0	0	0	0	1	1	1	2	2	1	2	0	0	0	0	0	10	158.00
	T-0	0	0	0	3	4	1	6	3	1	2	0	0	0	0	0	20	142.00
Engineer (Chemist, etc.)	E-0	0	1	2	5	1	3	3	1	1	0	0	0	0	0	0	17	114.71
	C-0	1	2	1	2	5	3	3	5	1	2	1	0	0	0	0	26	133.08
	T-0	1	3	3	7	6	6	6	6	2	2	1	0	0	0	0	43	125.81
Teacher (Minister, etc.)	E-0	1	2	0	0	0	1	0	0	1	1	1	0	1	0	0	8	145.00
	C-0	0	0	1	1	1	5	5	3	2	1	1	2	0	0	1	23	184.67
	T-0	1	2	1	1	1	6	5	3	3	2	2	2	1	0	1	31	160.32
Farmer (Stockman, etc.)	E-1	3	12	12	9	8	4	1	2	0	0	0	1	1	0	0	54	88.15
	C-0	3	8	9	12	10	6	5	7	2	3	0	0	0	0	0	65	111.85
	T-1	6	20	21	21	18	10	6	9	2	3	0	1	1	0	0	119	100.59
Storekeeper (etc.)	E-0	1	6	8	20	12	11	9	7	7	5	1	1	1	1	2	92	130.65
	C-0	0	4	6	12	19	15	9	7	6	5	4	5	1	1	1	95	142.21
	T-0	1	10	14	32	31	26	18	14	13	10	5	6	2	2	3	187	136.52
Labor	E-0	1	1	6	3	8	9	4	6	1	1	1	0	0	0	1	42	126.10
	C-0	2	3	3	7	6	2	5	3	7	1	2	1	0	0	0	42	130.48
	T-0	3	4	9	10	14	11	9	9	8	2	3	1	0	0	1	84	129.29
Salesmen Bookkeepers (etc.)	E-0	1	3	8	10	13	5	5	8	3	3	1	1	0	0	0	62	121.22
	C-0	0	3	7	4	7	11	4	10	4	8	1	3	1	0	0	63	145.87
	T-1	1	6	15	14	20	16	9	18	7	11	2	4	1	0	0	125	133.68

of education and professors). (5) Farmers. (We include stockmen, and those who are characterized by the word "agriculture" or "horticulture"). (6) Storekeepers. (We include also heads of firms of the non-retail variety and managers. (7) Labor. (In this classification we put all such trades as carpentering and plumbing and barbering that might belong to labor unions; and (8) Salesmen, bookkeepers, insurance men, accountants, and all others who do not fall clearly in any of the foregoing divisions.

In all eight cases the general rule we found before is true that the eliminated have a considerably lower intelligence average than those who continue. (Chapter V Concl. v). In the total group the children of teachers show the highest intelligence scores. The children of lawyers come next; and then in order downward, those of salesmen, laborers, doctors, engineers, and finally those of farmers. The order is similar for those eliminated. The children of teachers are at the top and the children of farmers at the bottom, with the children of doctors and engineers still in their unfavorable position next to the bottom. Children of lawyers, however, take their place behind storekeepers and laborers. Among the continuing, the teachers' children are at the top, the farmers' children at the bottom. The children of laborers, however, come next to last and the children of lawyers are next to highest. The relative position of the storekeepers and salesmen higher than that of doctors and engineers is striking.

Elimination takes place in this order: 88% of the doctors' children, 50% of the lawyers' children, 50% of the laborers' children, 50% of the salesmen's children, 49% of the storekeepers' children, 45% of the farmers' children, 40% of the engineers' children, and 20% of the teachers' children. With the exception of the teachers' children, who show both the highest intelligence means and the lowest percentage of elimination, there does not seem to be any marked connection between the percentage of elimination among a specific occupational group and the mean of their intelligence.

We revise our occupational divisions in considering the correlations of intelligence and grade scores for those continuing. (Table XXVII). We combine all children of professionals into one group, including doctors, lawyers, teachers, and engineers. We retain the classifications of storekeepers, farmers, and laborers. We omit entirely the too heterogeneous division of salesmen, etc. The children of the professional group have the highest intelligence. The middle men come second; the laborers third, and the farmers fourth* With the exception of that of the farmers' children which is a little more narrow, the distributions of intelligence among the various groupings is just about normal. The mean scores range in the same order as the means of intelligence. With but one exception, that of the children of laborers which is narrow, the sigmas here are close to

*Former studies have all been made among children below the University age. They show however similar results. Children of professional parents rank highest; children of middle men next. Children of laborers and farmers are always lower than the first two groups though there is a shifting of their relative position. (Bookll p 205; Duff & Thomson 83 P516; Freeman 41 P452; Macdonald 83 p 516; Pressey & Ralston 86 p. 453; Terman 107 p.63.)

TABLE XXVII

A. C. E. P. E. AND TOTAL GRADE SCORES

BY

FATHERS' OCCUPATIONS

OCCUPATION	NO. CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN SCORE	SIGMA SCORE	CORRE-LATION	P. E.
Professional	74	148.92	55.42	1.44	.73	.598	(.054)
Middle-Man	91	140.99	58.28	1.56	.67	.454	(.054)
Agriculture	64	110.31	49.08	1.17	.67	.442	(.067)
Labor	45	132.22	55.92	1.30	.59	.258	(.054)
TOTAL Continuing	427	136.74	56.00	1.31	.69	.530	(.026)

normal. The children of the professionals show a higher than normal correlation, between intelligence and grade ratios. The correlation of the middle men come next; and is lower than the normal correlation. The children of farmers come third; and of labor last. With the exception of the case of the professional group, there is no correlational gain in the dividing of students according to fathers' occupations. The homogeneity is more than balanced by the loss of number of cases and by the increase of the Probable Error. The fact, however, that there group correlations range in the order of their probable homogeneity is very suggestive. (Chapter V. Concl ix). Certainly the highest group, the professional, is most homogeneous. They come from homes where they hear good English spoken, where thoughtful and thought provoking conversations are everyday affairs, where the members of the family have vast stores of general information and where the intelligence is high. The lowest group on the other hand, the children of laborers, come from a variety of different kinds of homes. Some of them undoubtedly are very similar to those of the professional group; but others show the ravages of poverty, want, lack of time for conversation, absence of books and other cultural advantages. The result is that the heterogeneity of laboring homes pulls down the correlation to one of the lowest obtained. If some other device had been used for more accurately measuring social or economic status of the home environment and these scores partialled out from the correlations between grades and subjects, possibly considerably higher correlations would have been obtained.

E - CREEDS

We here divide out group according to their religious preferences.* We have no way of judging elimination here as the preferences were only obtainable for those who continued. The means of intelligence from highest to lowest (Table XXVIII) are in this order: Jewish, Presbyterian, Methodist, Episcopal, Baptist, and Catholic. The distribution of intelligence scores is very close to the same for all groups with the exception of the Jewish which, as well as showing an unusually high intelligence mean, shows an unusually broad internal variation. In other words, though they are, as a religious group, unusually bright they are by no means equally bright. Mean grade scores of all groups are close. They follow in general the order of the means of intelligence. The means of grades do not differ so much as is indicated by the differences between the means of intelligence.

The correlations between intelligence and grades from highest to lowest follow this order:- Methodist, Catholic, Jewish, Baptist, Presbyterian, Episcopalian. We would imagine that this is also their order of homogeneity so far as home background and economic status is concerned. Homogeneity raises the correlations(Chapter V Concl ix). From general observation, however, it would seem that the Catholic and Jewish groups tend to vary less than the Methodist group which has the highest correlation.

* There are no relevant previous studies. Comparisons of races and national groups have been made (Livesay (70) (Pintner 83 pp 447-470) Sometimes Jews are considered as a national rather than a religious group; they show high intelligence (Brill 15 with a critical resume of 23 other studies, also Pintner 83 pp 452-455)

TABLE XXVIII

A. C. E. P. E. AND TOTAL GRADE SCORES

BY

CREEDS

CREED	NO. CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN SCORE	SIGMA SCORE	CORRELATION	P. E.
Baptist	84	132.38	52.14	1.19	.67	.506	(.058)
Catholic	111	132.16	51.15	1.25	.76	.609	(.040)
Episcopal	24	141.75	55.68	1.56	.64	.331	(.121)
Jewish	20	175.00	65.88	1.67	.71	.587	(.101)
Methodist	68	142.35	55.52	1.45	.67	.615	(.054)
Presbyterian	45	150.00	53.32	1.41	.70	.408	(.080)
ALL Continuing	425	136.74	56.00	1.31	.69	.530	(.026)

F - INTENDED OCCUPATIONS

We consider now the students segregated according to their intended occupations (Table XXIX). We determine this classification by the election by a student of a certain number of credit hours in a professional subject. All students electing a professional subject are not necessarily intending to make that subject a life's work. It is necessary, however, to include as large a number of the desired class as possible. This could only be done by observation. We took nine credit hours as the index for Agriculture, Engineering, and Music. A large number of the Educational group were not included by this number. Teachers take so many courses in the subjects they desire to teach which are not labeled Education. Even six credit hours does not include all the prospective teachers. It does, however, eliminate those others who take a few hours of educational courses and do not intend to become teachers.

The groups who, by these criteria, show intention of going into definite professions are of a higher intelligence than those who do not. The means of intelligence of the Education, Engineering, and Music group, and in this order, are higher than the normal intelligence mean. It should be noticed here that, though all who elect educational courses display an intelligence mean lower than the normal, those who pass six or more hours of Education, are more intelligent than normal. Agriculture shows a lower than normal intelligence mean. Even this, 128.62, though comparatively low is much higher than the intelligence mean of those whose fathers

TABLE XXIX

A.C.E.P.E. AND TOTAL GRADE SCORES

BY

INTENDED OCCUPATIONS

OCCUPATIONS	NO. CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN SCORE	SIGMA SCORE	CORRE-LATION	P.E.
Agriculture (9 hrs.& more)	39	128.62	48.24	1.42	.66	.504	(.080)
Education (6 hrs & more)	55	159.38	64.78	1.47	.59	.514	(.067)
Engineering (9 hrs.& more)	78	141.54	49.96	1.13	.69	.410	(.065)
Music (9 hrs.& more)	15	140.67	57.02	1.79	.54	.329	(.154)
TOTAL (Continuing)	427	136.74	56.00	1.31	.69	.530	(.026)

are farmers 110.51. Most of the Agricultural students are children of farmers. So those,pointing for a definite agricultural life are more intelligent than the rest of the group from which they come. The distribution of intelligence varies greatly in the different groups. In Agriculture and Engineering the sigma is quite small; in Music, close to the normal; in Education, large. This shows more variation in intelligence among prospective teachers than among prospective farmers and engineers. The mean grade score of the agricultural students is above normal, their mean intelligence below. This may be due to the very large proportion of agricultural hours taken by agricultural students and, in them, an unusually easy marking system. (Chapter II Part A, Chapter V Concl vi and vii). Music shows a fairly high intelligence mean; but, with it, such an extremely high mean of grade scores that there is an indication here, too of a too easy marking system. The reverse of Agriculture is true of Engineering, which, with a fairly high intelligence mean, shows an extremely low mean of grades. The large proportion of engineering hours usually taken together with a very strict marking system is probably the cause here. A better standardized marking system would aid greatly in making better comparisons between different schools of the University. The distribution of grade scores is without noticeable significance and fairly close to normal in all cases.

Students, whose intended occupation is Education, show the highest correlation of these groups between intelligence and grade

ratios.* Agriculture is secondl engineering and music third and fourth respectively. All four of these correlations are below the normal. Beside unstandardized marking the advent of the element of more varied seriousness may be responsible. (Chapter V Concl xi). The students of agriculture show a close to the normal correlation, despite the unstandardized marking, evidenced from the discrepancies between intelligence and grade means, and the advent of seriousness, as testified by their intellectual superiority over the entire farm group. The probable reason for this is the homogeneous environment from which they come, including rural hours and schools. (Chapter V Concl. ix).

*See Table XII again for previous studies. None of these are strictly relevant.

G - ATHLETICS

Athletics, as a class, should give us a fairly homogeneous grouping to compare with the total student body.

(1) For our purpose we define an athlete in these ways. For a good many University enthusiasts athlete is synonymous with membership on the Football Team.

(2) An athlete may be considered as one who plays on any of the athletic teams. With the assistance of the athletic office at the University we were enabled to locate both these groups who were also included among the students of our study.

(3) We were not fully satisfied with either of these definitions of an athlete. There are at least a few who are training to teach athletics, among them several girls as well as boys, who are not playing on any of the University teams. The third definition of an athlete is one who shows his interest in athletics by taking more than the usual number of Physical Education hours.

We locate our athletes in a way similar to that by which we located those who were intending definite occupations; by segregating those cases who took nine hours or over of Physical Education and Military Science. We take this number because there were many military students who took eight hours of military work; but it was rare for them, unless they were exceptionally interested in athletics, to elect a single extra hour. This gave them sufficient physical exercise for six semesters. (Table XXX)

A glance at the intelligence means of all three groups shows that athletes tend to do much more poorly on the psycho-

TABLE XXX

A.C.E.P.E. AND TOTAL GRADE SCORES

FOR ATHLETES

JUDGED BY	NO. CASES	MEAN A.C.E.P.E.	SIGMA A.C.E.P.E.	MEAN SCORE	SIGMA SCORE	CORRE-LATION	P. E.
9 hrs. & more of Phys. Ed. & Mil. Sc.	34	100.59	46.00	1.09	.59	.720	(.055)
Membership on Football Team	10	104.00	87.18	1.60	.53	.184	(.206)
Membership on Any Team (Baseball 3, Football 10, Track 3, Basketball 3, Boxing 1, Doubling 3)	17	108.82	51.58	1.60	.65	.659	(.092)
TOTAL (Continuing)	427	136.74	56.00	1.31	.69	.530	(.026)

logical test than others.* The mean of those taking nine hours and over of Physical Education is the worst, that of the Football Team next, that of all teams a little better but still low. The distribution is very wide for the football players showing great intellectual variation. For the other two groupings, however, it is narrow. The mean of grade scores is low for the nine hours and over group. This is justified by the comparatively low intelligent mean. It is above normal, however, for the members of teams, though their intelligence means are also low. There is evidently a tendency either for athletes to obtain higher marks than they deserve, in order for them to fulfil the requirements necessary to stay on the team; or they may put out a greater effort to make their grades. The former reason is probably the closer one, as the time necessarily spent on athletics would not give them the requisite opportunity for making the greater effort. The sigma of grade scores is close to normal for the members of all teams. For the members of the Football Team and those taking a large amount of Physical Education the sigma is very small. This shows an unusually narrow distribution of grade scores or a tendency for all these students to receive around the same grades. The leniency in bestowing of passing grades on this group and the absence of very high scores because of low intelligence, are impossible.

The Football Team shows one of the lowest correlations between intelligence and grade ratios. This indicates as well as the unstandardized marking, a great degree of heterogeneity. A hasty

*A study at the high school level shows the athletes more intelligent than the non-athletes. (Jones 62).

perusal of some of their records indicates that this is true. The members of the Football Team come from vastly separated parts of the country. The entire student body on the other hand is predominately from Louisiana, and almost all from the South. The members of the Football Team have greatly varying degrees of intelligence as seen by the very high sigma of their intelligence scores. One of these students actually displays the highest record of any one in the whole student body in one of the five parts of the Psychological Examination (the Arithmetic Test)*. There must be also a great variation of seriousness. (Chapter V Concl. xi). Some of these students undoubtedly come to University primarily to play football; others find this as an opportunity to realize their life's ambition. There is, therefore, a great degree of heterogeneity with a resulting low correlation between intelligence and grades. On the other hand, when we consider as athletes those who take nine or more hours of Physical Education, or those on all teams we have groups who represent a much more normal cross section of the whole student body as far as all factors but their athletic interest is concerned. They constitute, therefore, in regard to this interest, a more or less homogeneous grouping. We find the correlations accordingly very high, .720 and .659, respectively. (Chapter V Concl ix). In other words where athletic interest is kept constant, and the group is otherwise a normal group, there is a likelihood that their comparative ranking on the intelligence test will be a very good indication of their comparative ranking in their grade ratios.

*G. Tinsley.

CHAPTER V

CONCLUSIONS

In this study we have attempted to look at the relation of intelligence, as tested by the American Council on Education Psychological Examination, to average grade scores, as computed by a special method we have outlined. We have considered all the students who continued through to their fourth year in the University as a control group. We have taken their scores in the whole psychological examination and their grade ratios in all subjects, together with the correlation between them as the normal result. The number of continuing students was 427. Their mean score in the Psychological Examination was 137.74 with a Standard Deviation of 56.00. Their mean grade ratio was 1.31 with a Standard Deviation of .69. The correlation between intelligence and grades was .530 with a Probable Error of .026. With these normal results we compared segregated groups, made more homogeneous by the coexistence among all members of some common factor. The factors we considered were elimination, specific semesters, work in individual subjects or groups of subjects, performance on parts of the psychological examination, and finally the personal elements, sex, age, hometown, father's occupation, creed, intended profession, and athletic inclination. The validity of our normal results is shown by the fact that in the cases where we were enabled to keep the Probable Error low by a large number of students in our segregated group, the results were always very close.

1. We consider, accordingly, the correlation of .530 as the normal correlation between intelligence and marks at the college

level; and hold that this shows us, for purposes of prognosis, that intelligence alone accounts for 50% of the factors that go into the making of general academic success. *1

ii. Comparing the intelligence means we find that certain groups tend to be brighter than other groups, girls than boys, younger students than older students, those whose fathers are teachers than those whose fathers are farmers, those who have little inclination for athletics than those who have much, those who elect abstract, cultural, or reputedly difficult subjects than those who elect concrete, practical, or reputedly easy subjects.*2

iii. The differences in intelligence means, however, do not show any consistent effect on the size of the correlation between intelligence and grade ratios. For example girls with a higher than normal intelligence mean produce a higher than normal correlation. On the other hand engineering students with a higher than normal intelligence mean produce a lower than normal correlation. It is true, however, that

iv. extremely below or extremely above normal intelligence means have a tendency to upset also the "normality" of the correlation, though in no consistent direction.

v. Elimination usually increases the intelligence of the continuing group, though there are a few exceptions. For instance eliminated students from non-Southern States are brighter than those who continue.

*1 See Chapter I Subsection A on "The Meaning of Prognosis"
*2 There are other interesting comparisons of intelligence means in Chapter II - IV

vi. Where the grade ratio mean is out of line with the intelligence mean the correlation is abnormal. By that we mean that where the intelligence is high and the grade ratio low, or vice versa, we find exceptionally high or exceptionally low correlations but in no consistent direction. The implication is accordingly here that

vii. marking systems are not strictly comparable from course to course, and from school to school, even within the same institution. It is usually assumed that poor marking lowers the correlation.* "The very low correlations-----are probably due to the variation in the marking standards of different institutions" says Freeman. (41 p. 373). If this were entirely true, more homogeneous groupings, by subjects or schools of the University where marking standards are less variable, should produce higher correlations. This is by no means consistently so. We offer the suggestion that usually poor marking produces another variable factor in which case it helps reduce correlations. In other cases, however, poor marking is responsible for an undue emphasis in estimates of worth on the intelligence component, in which cases it increases the correlation. Standard tests in all university subjects the grading of which is based on national norms equated from subject to subject would aid considerably in rooting out this element of prognosis uncertainty. We found, however, that in all cases

viii where the average number of credit hours taken and the

* Bingham 5 p. 56; Boardman 8. p. 455; Huffaker 55; Stagner 99.

number of students considered were both large, as in English, and the Social Studies, the correlations obtained were nearly normal. This is probably due to an averaging out of the most unreliable scores.

ix. The largest element contributing to high correlations is homogeneous grouping. Keeping one factor other than intelligence constant as in the case of each of our segregated classifications, usually raises the r. This must not be confused with

x. homogeneity of the intelligence component which tends, contrariwise, to lower the resulting correlation, for it gives us a selected portion of the normal frequency curve in respect to the factor tested. (Jones 59). Just as homogeneity raises the correlation heterogeneity lowers the correlation. It, therefore, means that in any segregated group where some factor is more variable than in the total group, the homogeneity obtained through the segregation may be overcome by the increase of the variability of some other factor. This tendency is very marked among groups which naturally have their attention more riveted to the necessity of making a living. Boys, more than girls, older students more than younger students, students already working toward a specific profession, more than those who have made no selection, students in professional subjects, rather than the same students in their academic subjects, all show definitely lowered correlations despite their segregation from the total student body. We would call this variable seriousness.

xi. This increase in the variability of seriousness lowers the correlation between intelligence and marks. *1. Undoubtedly tests can be devised to measure this factor. It may even be found to be measured by some of the personality tests or temperament tests already published.*2. If this element of seriousness could be fairly accurately measured and combined with the psychological examination and possibly also some measure of home environment, such as the Sims-Score card, and then these heterogeneous influences properly partialled out, the predictive and prognostic value of intelligence testing would be greatly enhanced.

xii. The five parts of the psychological examination were planned to test different elements contributing to what we generally call intelligence or educability.*3 They are as unlike each other as tests can be. Particularly is this so of the Arithmetic Test and the Artificial Language Test. Yet all five parts show correlations of well over .600 with the complete examination. This would indicate that there is at least some element that is common to these tests and may point to some substantiation of Spearman's "G".*4.

*1-This element has been noticed by others. Jones and Laslett (61) explain that the element making high school marks more prognostic than the psychological examination is "habits of industry". Stagner(99) finds an "energy output independent of marks". Jones (59) says "outside work which is also a contributing cause to seriousness lowers the correlation.
*2-Stagner (99) suggests the use of personality tests to measure the energy output".
*3-See Chapter I Part B on the A. C. E. P. E.
*4-See Pintner 83 pp. 62-71; also Freeman 41 p. 479-481

xiii. We found, however, that certain parts are better than others for specific projects. The Analogies Test is a far better guide to good Mathematics students than even the whole examination. No other part, however, serves as well as the total examination for any other subject or group of subjects.

Studies of this type always leave us with more problems than we had when we started. There is still a need for:-

(1) Multiple and Partial Correlations of the five parts of the examination with grade ratios and also experimentation with weighting the parts for various usages.

(2) A study of the correlation between intelligence and grade scores with Socio-Economic status, as tested by some such device as the Sims-Score Card, partialled out.

(3) A study of the correlation partialling out the results on an extroversion-introversion test, the composite of the factor we have called seriousness.

(4) A comparative study of the intelligence and grades of athletic and non-athletic students in different universities.

(5) A study of the causes of elimination in connection with intelligence.

(6) Experimentation in standardizing marking systems and studying their effects on intelligence-grade correlations.

We are convinced that further research will make such a device for measuring educability,as the American Council on Education Psychological Examination, indispensable in the administration of the modern college.

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BIOGRAPHY

Walter Gilbert Peiser was born in Brooklyn, N. Y., July 2, 1899. He is the son of Jennie Getz and William Peiser. He is married to Frances Shohl of Cincinnati and has one daughter, Gretchen. He graduated from Public School 78 in Brooklyn in 1915; from Boys' High School, Brooklyn, in 1917. He received his Bachelor of Hebrew Laws degree from the Hebrew Union College in 1920, his Bachelor of Arts degree from the University of Cincinnati in 1921, and was ordained and awarded the degree of Rabbi in 1924. He also attended the Cincinnati Law School. He has served as Rabbi in Cleveland, Ohio, Austin, Texas, and Baton Rouge, La. where he is now completing his tenth year. He has been studying Psychology as a hobby and has taken his work in that subject at the Universities of Cincinnati, Columbia, Southern California, and Louisiana State. He is a member of Pi Gamma Mu, National Honorary Social Science Fraternity, the Central Conference of American Rabbis and is an honorary member of the Scottish Rite of Masonry and the Shrine. He has served on the Boards of numerous social service organizations including the Anti-Tuberculosis League, the Red Cross, the Salvation Army and the B'Nai Brith.